WILSON ORNITHOLOGICAL CLUB

Old Series, Vol. LVIII

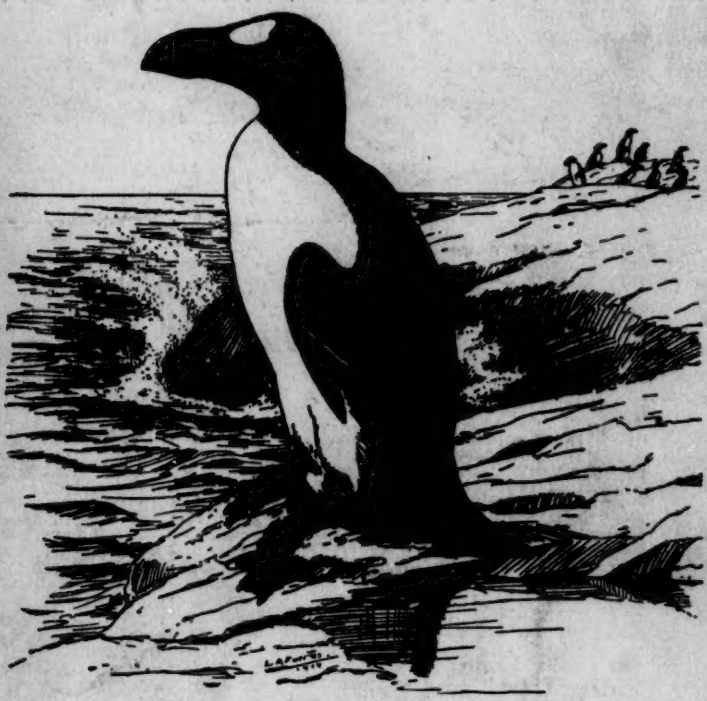
CONTINUATION OF THE BULLETIN OF THE NUTTALL ORNITHOLOGICAL CLUB

New Series, Vol. L

The Auk

A Quarterly Journal of Ornithology

THE AUK. L, No. 3. JULY, 1933



PUBLISHED BY

The American Ornithologists' Union

LANCASTER, PA.

Entered as second-class mail matter in the Post Office at Lancaster, Pa.

CONTENTS.

OUTRAM BANGS, 1863–1932. By *James L. Peters.* (Plate IX) 265

TOPSELL'S 'FOWLES OF HEAUEN'. By *Bayard H. Christy.* (Plate X) . . . 275

THE RELATIONSHIP OF LIGHT PERIODICITY TO THE REPRODUCTIVE CYCLE, MIGRATION AND DISTRIBUTION OF THE MOURNING DOVE. By *L. J. Cole.* 284

NOTES ON THE HAVEMEYER COLLECTION OF CENTRAL AMERICAN BIRDS. By *Ludlow Griscom.* 297

SPEED OF BIRD FLIGHT. Compiled by *May Thacher Cooke* 309

THE FIRST APPEARANCE AND SPREAD OF THE EUROPEAN STARLING IN OHIO. By *Lawrence E. Hicks* 317

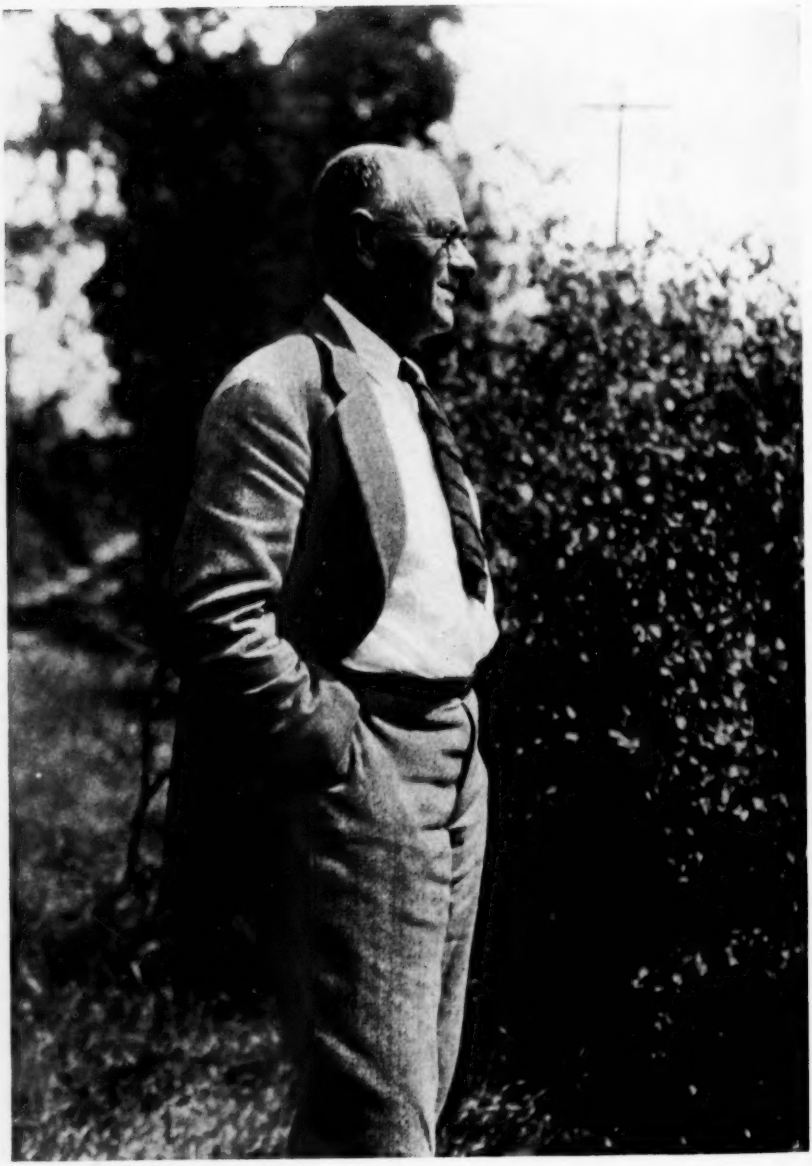
NOTES ON SOME BIRDS FROM SANTA CATHARINA, BRAZIL. By *C. Eliot Underdown.* 323

THE DOVEKIE INFLUX OF 1932. By *Robert Cushman Murphy* and *William Vogt* 325

GENERAL NOTES.—A Record Colony of Yellow-crowned Night Herons, 350; Definite Breeding of the Glossy Ibis in Louisiana, 351; The Glossy Ibis in Georgia, 352; Greater Snow Goose at Troy Meadows, N. J., 352; The Blue Goose in North Carolina, 353; The Pintail Duck Wintering in Maine, 353; The European Widgeon again in Maine, 354; Teals Resting on Plowed Ground, 354; Blue-winged Teal Breeding in Cheshire County, N. H., 354; Golden Eagle in Louisiana, 355; Broad-winged Hawk and Starlings, 355; Eastern Red-tailed Hawk Breeding on the South Carolina Coast, 256; The Western Pigeon Hawk in Florida, 256; Notes on the Prairie Chicken in Indiana, 256; Some Feeding Habits of the Solitary Sandpiper, 257; A Willet in the Connecticut Valley in New Hampshire, 358; Northern Phalaropes on the New Jersey Coast, 358; Second Occurrence of the Northern Phalarope in South Carolina, 358; Wilson's Phalarope in Berkshire Co., Mass., 359; Golden Plover, A New Species for Alabama, 359; Black Terns at Harrisburg, Pa., 359; Terns near Phoenixville, Pa., 359; Laughing Gull Breeding on the South Carolina Coast, 360; Brünnich's Murre Feeding in Fresh Water, 360; West Virginia Breeding Record of the Saw-whet Owl, 361; Chuck-will's-widow again in Ohio, 362; An Old Specimen of Hybrid Flicker from Central Arkansas, 362; Nesting of the Rough-winged Swallow in Montana, 362; The Starling as a Mimic, 363; The Names of Two Genera of Timaline Birds, 363; The Loggerhead Shrike, an addition to the Virginia Avifauna, 364; Western Palm Warbler in Massachusetts in Spring, 364; The Hoary Redpoll in Montana, 365; Bachman's Sparrow in the Virginia Blue Ridge, 265; A Late Migration of Fox Sparrows, 365; The Lark Sparrow in Virginia, 366; European Goldfinch in Western Massachusetts, 366; Notes on the Birds of Berkshire County, Massachusetts, 366; Notes from Dorchester Co., Maryland, 367; Winter Notes from Back Bay, Virginia and North Carolina, 368; Notes from Baldwin County, Alabama, 368; Notes from Mountain Lake, Florida, 370; Notes from Tippecanoe Co., Indiana, 370; Bird Notes from the Chicago Area, 371; Recent Records for Oklahoma and Texas, 373; The Importance of Stoneflies in the Winter Food of Certain Passerine Birds, 373; Speed of Racing Pigeons, 374.

RECENT LITERATURE.—Leopold's 'Game Management,' 376; Jones on 'Insect Coloration and the Relative Acceptability of Insects by Birds,' 377; Fauna of the National Parks, 377; Bond's 'My Bird Boarders,' 378; La Touche's 'Handbook of the Birds of Eastern China,' 378; Swann and Wetmore on the Birds of Prey, 378; Other Publications, 378; The Ornithological Journals, 381.

NOTES AND NEWS.—Financing 'The Auk,' 384.



Vincent J. Izzi
Outram Bangs.

THE AUK:

A QUARTERLY JOURNAL OF ORNITHOLOGY.

VOL. L. JULY, 1933. No. 3.

OUTRAM BANGS, 1863–1932.*

B. JAMES L. PETERS.

(*Plate IX.*)

OUTRAM BANGS, a Fellow of the American Ornithologists' Union, Curator of birds at the Museum of Comparative Zoology and one of the greatest ornithologists that this country has ever produced, died at his summer home at East Wareham, Massachusetts, on September 22, 1932, after an illness of two weeks.

He was born in Watertown, Massachusetts, January 12, 1863, second son of Edward and Annie Outram (Hodgkinson) Bangs. For a good many years after his birth Watertown was a small country town with many large farms and estates and surrounded by woods, open fields and market gardens. For one of young Outram's tendencies Watertown was ideally situated, as it was easily accessible from Boston and lay at the threshold of the beautiful New England countryside immediately to the westward. His parents also owned a house in Boston which they occupied during the winter months.

Bangs was one of those fortunate mortals, born with a love of nature and the outdoors that rule their entire lives. As boys, he and his brother Edward A., two years older, were inseparable companions in their rambles about Watertown and the surrounding country. They began the collection known in later years as the "Collection of E. A. and O. Bangs," long before their parents

* Read at the Fiftieth Stated Meeting of the American Ornithologists' Union, Quebec, October 18, 1932.

entrusted them with fire-arms, their specimens being taken with catapults or "sling shots," in the use of which the boys developed considerable dexterity. The catapult was supplemented by stick traps or horse hair nooses as occasion offered. In the course of their wanderings the Bangs boys found C. J. Maynard who helped them to improve their skins and sold them specimens. Like all boys of their age and day the Bangs brothers collected birds eggs, but went to great pains to secure more species than the average boy. Finding that Nighthawks were breeding on the flat, gravelled roofs of houses in the Back Bay district of Boston, the problem that presented itself was that of getting up onto the roof of a house where a Nighthawk might be breeding. The simple but effective stratagem was to start playing ball in the street, after a time manage to throw the ball up onto the roof and then ask to be allowed up to look for the ball.

When Outram was about 10 years old his family went to live in England for nearly a year. It was in 1874 at Oundle, in Northampton, that he had his first experience with fire-arms. In some way or other he and an English cousin saved up enough from their respective allowances to purchase an antiquated horse pistol. Armed with this weapon they started out to collect something, first loading the pistol with what seemed to be the requisite amount of powder and shot and then adding a little more for good measure. After the first shot the collecting expedition ended abruptly, for the horse pistol disintegrated, leaving the young shooter holding the remains of the butt. By some miracle neither of the boys was injured. Mr. Bangs, after learning of this incident gave Outram his first gun, feeling that he would be safer with a suitable piece, than with some other makeshift.

Returning to this country the Bangs brothers continued their collecting activities at every opportunity. For a time beginning in the fall of 1876 Outram kept a diary in which he recorded his activities. Much detail is devoted to the pursuit of birds, with occasionally some casual mention of school or lessons. The following entry was made on January 12, 1877, his fourteenth birthday: "This morning was my burthday and we did not go to school. While we were at breakfast we saw a snowy owl and went after him across the ice on the [Charles] rivver and Ned [E. A.

Bangs] went around to Cambridge. I got within about 10 Paces when he flew, I fired but had a miss fire. He lit again and I went after him and this time it went off but I did not get him. I got out of Cartridges so I came back. I had five presents . . . . . a case fore the sixteen bore gun . . . . . and a thousand printed labels for our birds."

Judging from the stories of his early experiences that Bangs liked to tell on occasions, one wonders that he or his brother did not meet some untimely end. The buggy in which they went on their more extended trips to Wayland and Sudbury was usually laden with an assortment of firearms, all of them loaded and most of them cocked. Once when in a hurry to return home they prodded their horse with the muzzle of an old fashioned English "rook-rifle," the trigger caught on the dasher and the rifle was discharged, the ball just penetrating the skin of the horse's rump. Bangs often told how their main concern was that their misdeed might be discovered and followed by a parental edict forbidding the use of horse and buggy in the future. They drove to a veterinarian whom they knew, swore him to secrecy and explained the situation. He extracted the bullet and dressed the wound. The incident was never discovered. On another occasion Outram and some other boys set out to visit the islands in Boston Harbor in a rowboat; one of the crowd managed to shoot a hole in the bottom of the boat and it required their united efforts to keep from swamping.

Bangs attended Noble's School in Boston where he prepared for Harvard College, which he entered in the fall of 1880. Attendance at college naturally curtailed his field activities to some extent, but he still collected locally, found time to go shooting in the autumn and of course his summers were free and generally spent at Wareham, Massachusetts, where his family owned a large property. While in college he took up wrestling and won the college lightweight championship. After completing his college course in 1884 he spent some months on a ranch in North Dakota where he enjoyed Prairie Chicken shooting, but did not add to his collections.

Returning to Boston he commenced his brief business experience, entering the office of the C. B. & Q. railroad. He remained there only a short time; office routine proved irksome and uncongenial and since it was not absolutely necessary for him to earn his living,

he wisely chose to follow his natural inclinations. The next few years were devoted to extended shooting trips in the fall and to fishing, and while thus engaged he collected a few specimens. Most of the accessions to the collection during these years were by exchange or purchase.

About 1890 he conceived the idea of systematically studying the mammals of eastern North America, inspired no doubt by the efforts of C. H. Merriam and the latter's colleagues in the Department of Ornithology and Mammalogy of the Department of Agriculture. Either alone or with his brother Edward or with his friend Gerrit S. Miller, he trapped assiduously in New England and Nova Scotia, besides making a trip to Lake Edward, Quebec, in the fall of 1895. His three field trips of major importance, on the results of which his most noteworthy papers in the field of mammalogy were based, are as follows. From January 30 to March 9, 1895 was spent at Oak Lodge, opposite Micco, Brevard County, Florida. In 1896 he worked at St. Mary's, Georgia from March 9 to April 19, also making short visits to Cumberland Island, and to localities on the Florida side of the St. Mary's River. His third and last trip to the south was made in 1897 between February 4 and April 6 when he collected at the following localities in Florida: Point Matanzas, Carterville, Anastasia Island, Oak Lodge, Eau Gallie and Gainesville. In addition to the mammals which he collected personally he had collectors working for him in Labrador, Newfoundland, Georgia, Florida, the Florida Keys and the coast of Louisiana.

One of the incidents of his local mammal trapping that he sometimes referred to was how he and Gerrit Miller saved the Muskeget Island Beach Mouse (*Microtus breweri*) from extinction. One summer while trapping on Muskeget they found the island overrun with house cats gone wild, but not a sign of Microtus. On a smaller island separated by only a narrow channel the mice occurred in abundance. He and Miller procured some catnip and either trapped or shot every cat on the main island; they then waded over to the smaller island and caught a large number of mice with which they restocked Muskeget. The following winter the smaller island was washed away in a storm.

While up to 1894 he had never published a paper of any kind,

between 1894 and 1899 he has over 70 titles to his credit, 55 of them on mammalian subjects, usually papers of considerable length and involving the study of large amounts of material. The fifteen papers on birds published during this same period were chiefly short notes on birds of eastern North America. Just what caused Bangs to turn from mammals back to his first love, birds, he never exactly knew himself. It was probably a combination of circumstances; perhaps he felt that the eastern North American field for mammals was pretty well exhausted, while the West was being worked by Merriam and others; perhaps he felt that the ornithology of Central and South America offered a wider field. Whatever may have been the cause his change of interests took place between 1898 and 1900. Suffice it to say that from the time that W. W. Brown began to send him birds from the Santa Marta region of Colombia in 1897, Bangs gradually dropped out of systematic mammalogy and became more and more engrossed in ornithology.

His connection with the Museum of Comparative Zoology dates from 1899. In that year his collection of mammals, numbering 10,000 skins and skulls and including over 100 types, was purchased by subscription and presented to Harvard College; at the same time Bangs was appointed Assistant in Mammalogy. His collection of birds remained at his home in Boston and was now growing rapidly. During the time he spent at Cambridge in caring for the collection of mammals he found time to assist William Brewster in arranging and identifying a good many birds that had laid unidentified for a long time. His first paper in the Museum Bulletin was published in 1901 and dealt with a collection of birds then recently acquired from the Riu Kiu Islands.

During the first few years of the present century when both Bangs and his life long friend John E. Thayer were actively building up their private collections, they coöperated in sending out collectors. Bangs was primarily interested in Central America, Thayer in North America. Collectors in the employ of one or the other worked in Lower California, Mexico, British Honduras, Costa Rica, Panama and the West Indies; the resulting collections were often worked up jointly.

During the course of his studies of Central American birds

Bangs often had occasion to take material to the National Museum for comparison, and these visits resulted in friendships with such ornithologists as Ridgway, Richmond and Nelson.

In 1908 Bangs' splendid private collection of birds numbering 24,000 skins, all beautifully prepared, adequately labelled and fully identified, was presented to the Museum. From that time on he assumed actual charge of the arrangement and building up of the Museum's bird collection. Nominally he was in charge of the mammals and Brewster of birds, but the latter was only too glad to have another share with him the work and responsibility. Bangs' success in bringing the collection from its small and insignificant position to one of the finest in the world is well known, but the time and effort and ceaseless attention that he lavished upon it can never be fully appreciated. For many years he worked practically single-handed, but during all this time collections that came in were promptly reported on, the birds catalogued, put away in neat rows in which not a skin was out of line, cases carefully labelled and trays marked with the name of the species they contained. No specimen was ever misplaced, every skin instantly accessible. He found time to arrange a first series of many of the larger and more important families. The neatness and orderliness of the arrangement of the collection was his pride and joy; clumsiness on the part of others which resulted in the jumbling of specimens in a tray was positively painful to him. I have seen him spend hours rearranging trays that some careless visitor had disarranged, but never by word or manner did he ever intimate to the culprit that such carelessness was only adding to his heavy duties. Kindness was Bangs' most outstanding characteristic, he hated to hurt anyone's feelings or to disappoint anyone. He often exchanged a rare bird from a very small series because he disliked to say "no" under any circumstances. No matter how busy he might be he gave every visitor to the bird room all the assistance that lay within his power.

In addition to the characteristics which made him an unexcelled curator, he possessed to a remarkable degree a faculty that every successful systematist must have, namely the "specific sense." While such a sense must be an inherent part of the systematist's make-up, it can be sharpened by constant experience and in

Bangs' case became very acute. His memory too was remarkably developed along certain lines; he had no memory at all for names, either of men or birds, rather it was photographic; he could instantly again identify any bird that he had ever seen or handled, if at a loss to recall the name he could go at once to its place in the collection or pick out a reference to it in literature, or bring up some interesting historical fact concerning it, some peculiarity in its systematic position. In short, he could identify a bird in many other ways besides giving a name to it. In many cases he could identify at first glance a bird that he had never seen before; this was done apparently by a rapid mental process of elimination, after placing the bird in its family. He also had an uncanny ability correctly to place a bird in its proper systematic position by merely looking at it, its gross external characters and "general effect" being all that was necessary. Birds whose classification he questioned years ago have more recently been removed to the position he advocated as a result of anatomical studies by others.

Although his knowledge of birds from all parts of the world was profound, for many years the birds of China interested him more than those from any other region. He therefore devoted much time and effort to building up this side of the collection, with the result that the Museum now has what is probably the finest and most complete series of Chinese birds anywhere, while Bangs himself was recognized as a leading authority on Chinese birds.

Bangs was a prolific but not a voluminous writer; the number of titles in his bibliography amounts to about 275 and covers not only his earlier work on mammals but a great variety of ornithological subjects; descriptions of new genera and species, faunal papers, taxonomic and nomenclatorial discussions. His writings are characterized by an individuality and forcefulness of style entirely his own in which the conventional is disregarded when his ideas did not agree with generally accepted theories.

One reason for Bangs' success as an ornithologist was his open-mindedness and readiness to modify his own views. He was the first of the American ornithologists to break away from the American conception that actual intergradation is a necessary criterion of the subspecies; he was also one of the first to register his disapproval of the excessive multiplication of monotypic genera based on slight

differences of external structure. In describing new forms he went to a great deal of trouble to pick out appropriate or distinctive names; adhering to the idea that a short classical word made the best one, such common names as *minor*, and *saturatus* he refrained from using however apt they might be, patronymics he seldom used and was never guilty of burdening nomenclature with geographic names.

Outside of his beloved collection of birds he had three other interests, hunting, fishing and horticulture. Mention has already been made of his fondness for shooting, but by this is to be understood only upland shooting over dogs. Up to the time of the first attack of the circulatory trouble, four years before the one that led to his death, he was afield in the covers on every favorable day during the open season. Ruffed Grouse and Woodcock were his favorite game birds, but he also enjoyed snipe shooting when there were plenty of these birds about. Duck or shore bird shooting did not interest him at all. As a fisherman he was devoted to trout, chiefly because pursuit of them lead him out into the beautiful New England streams in the spring and early summer. At his home in Cambridge he had a conservatory built against one side of his house and here he raised and cared for those varieties of plants and shrubs of which he was particularly fond; during the summer he always had a small flower garden both in Cambridge and at his summer home in Wareham. Long experience and a natural taste made him a successful propagator by all the methods in vogue among horticulturists.

Bangs' one and only field trip outside of North America was made to Jamaica in 1906 and was cut short by an attack of dengue fever; he was on the island only a little over a month, collecting about 100 birds in that time. When we consider his love of the outdoors, that he liked to collect and could make a good bird skin with a reasonable degree of speed, it seems strange that he did not take the field frequently. The fact remains however that he did not and it is just as well so, since the Museum could ill spare his curatorial services and an ornithologist of his calibre can often perform more valuable service by remaining at his desk.

During the summer of 1925 he made a trip to Europe for the purpose of visiting the principal museums, meeting ornithologists,

and arranging for exchanges. The most important result of his journey was the visit to his friend J. D. LaTouche in County Wicklow, Ireland, where arrangements were made for the purchase of LaTouche's splendid collection of Chinese birds.

His membership in the A. O. U. dates from 1884, when he was elected an associate member. He was chosen a Fellow in 1901. That Bangs never held office in the A. O. U. was entirely of his own choosing. Naturally averse to presiding or to speaking in public, he discouraged any efforts on the part of his friends to propose his name for any position.

In 1918 his Alma Mater recognized his devoted services to the Museum as well as his scientific attainments by awarding him an honorary degree of A.M. with the following characterization, "A naturalist from childhood with zeal unchanged through life."

Always an active and vigorous man accustomed to wading the icy streams in spring and tramping the woods and meadows in the fall, his first illness, four years before his final one, brought a sudden curtailment of his outdoor activities. His doctor forbade hunting, fishing or even the care of his conservatory. It was then that Bangs' calm and philosophical disposition kept him happy and contented with life as he was thereafter forced to live it. He said that he did not mind giving up shooting since hunting in New England was too much of an effort for the return; the same philosophy applied to fishing, and he claimed that it really was a relief not to have the care of his plants on his mind any longer. Going about in the evening and attendance at meetings was likewise discouraged by his doctor's edict, but to one of his retiring disposition this order was not in the least a hardship.

In addition to his membership in the Union he was a Foreign Member of the British Ornithologists' Union, a Corresponding Member of the Deutsche Ornithologische Gesellschaft, a member of the Washington Academy of Sciences, New England Zoological Club, Boston Society of Natural History, Biological Society of Washington, Cooper Ornithological Club, and a charter member of the American Society of Mammalogists.

There remains only to mention his connection with the Nuttall Club. He was elected to membership in March 1880 and at the time of his death there were only three living members whose span

of membership exceeded his. He served as a member of the council from 1897 until ill health forced him to resign that office in 1929. On March 17, 1930, the occasion of the fiftieth anniversary of his election to membership, he was with difficulty prevailed upon to attend, but the fact that his friend Thomas E. Penard was to read a paper on the life of Lafresnaye was an argument that he could not resist. Bangs was greatly surprised at the significance of the meeting and more so when copies of his paper "Types of Birds now in the Museum of Comparative Zoology" were distributed to those present. His list of types had been submitted for publication as a Museum bulletin some time previously, but he had no inkling that it had even gone to press, or that it was to appear as it did as an anniversary publication. As a further token of the esteem in which he was held by his fellow members he was presented with a handsomely engrossed salutation which reads:—

" 'The Nuttall Ornithological Club salutes Outram Bangs, its most distinguished member. Elected fifty years ago you have accomplished greatly. Vigorous beyond us all, you stand today a naturalist and a sportsman beloved by all your peers. You have inspired young men, encouraged explorers, aided your fellows. From a pitiful nucleus you have built a collection of birds uniquely and very completely serviceable. Above all you have been our warm and unswerving friend. We know no higher praise and we wish you many happy days to come.'

'Winter may come; he brings but nigher
His circle (yearly narrowing) to the fire
Where old friends meet.'

'The wisdom of a learned man cometh by opportunity of leisure.' "

Museum of Comparative Zoölogy,
Cambridge, Mass.

TOPSELL'S 'FOWLES OF HEAUEN.'

BY BAYARD H. CHRISTY.*

(*Plate X.*)

THOSE of us that are book-collectors and run through the catalogues have noted the name, Edward Topsell. But we have noted it, for the most part, only to pass it by. And for several reasons. Chiefly, because his are essentially European works, and because he had to do with quadrupeds and reptiles, but not at all with birds. We have gleaned the information that Topsell flourished at the beginning of the XVII century; that he was a disciple of Konrad Gesner; and that he was the redactor to his countrymen of his master's work. Now it appears that by a narrow margin he has missed a place among the fathers of ornithology, and even among the fathers of American ornithology. And by the same chance the booksellers do less with their Topsell items.

In the Huntington Library, at San Marino, California, lies a MS. which on examination proves to be the beginning of a treatise by Topsell on birds; and this, had it been completed, would, with his published work, have rounded out and completed a comprehensive review of natural history. The MS. was shown to me, a casual visitor to the library, for no other reason than that I was known to be interested in birds. Turning its pages, I came, to my surprise, upon a number of species from Virginia, and because here were early notes upon birds of our Atlantic seaboard, it has seemed worth while to review the matter with care. The courtesy of the Library was shown me: I had opportunity to examine the MS. minutely, to make transcript from its text, and to have reproduction made of one of its illustrations. Captain R. B. Haseldon, curator of manuscripts, and Miss Norma Cuthbert, head cataloguer, most generously aided me in study.

Edward Topsell (d. 1638 *circ.*), an English clergyman, and sometime curate of St. Botolph, Aldersgate, is chiefly remembered

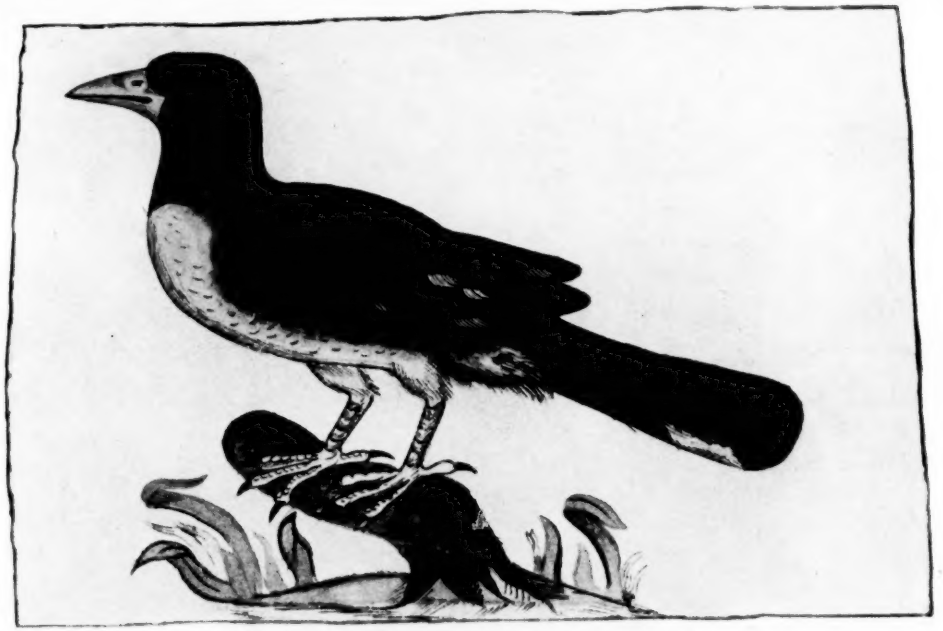
* Read at the Fiftieth Stated Meeting of the American Ornithologists' Union, Quebec, October 18, 1932.

as the author of the works to which allusion has been made. His 'Historie of Four-footed Beastes' appeared in 1607, and his 'Historie of Serpents' in 1608. It now appears that, having projected a third work on 'The Fowles of Heauen,' he progressed with it so far as to complete a first part—perhaps one fifth of the contemplated whole. The dedication is to Baron Ellesmere, the Lord Chancellor; to him, as may be supposed, the MS. was transmitted; and from a descendant of his the Huntington Library, in 1917, acquired it. Resting today in the archives of that library, it forms part of the Ellesmere Collection, and bears identifying number, E L 1142.[1]

It is a MS. of 248 leaves, bound in vellum, and is in perfect condition. The leaves are of rag paper, in size 8¾ inches x 12⅞; both sides are written upon; the face of the writing is 6¼ x 11, more or less, and is framed in ruled lines in red. The illustrations, of which there are 124, are executed in ink and water-color upon separate pieces of paper, which vary in size, from 2 inches x 3 to 5 inches square, and they are neatly pasted to the pages of the book. There is internal evidence that the MS. is not a holograph, for the author alludes to his 'writer.' The dedicatory epistle, however, which is written in Italian script (the body of the MS. is in the crabbed ordinary script of the day) and signed 'Edward Topsell,' and the names of particular species, written upon certain of the illustrations, may, either or both, have been indited by Topsell himself. The date, too, is indicated. The author addresses his patron 'five or six years' after the two earlier works had been completed; and, since the second of these had been published in 1608, it follows that this, the first part of the 'Fowles,' had been written before the end of the year 1614, and perhaps a year or two earlier than that.

The arrangement (copied from Gesner) is that employed in the 'Four-footed Beastes' also, and in the 'Serpents:' the 'kinds' are presented in alphabetical sequence,—as good an arrangement as any available in 1614. This first installment of the 'Fowles' begins with the 'Alcatraz' (= Pelican), includes 39 'kinds,' and continues as far as the 'Cuckowe.' Some of the kinds are

[1] 'The Huntington Library Bulletin' for May, 1931 (I, 49).



Topsell's Painting of the Churrheao (= Towhee).

UNIV. OF MICH.

isolated species; others are groups of birds of recognized (and in most cases properly recognized) affinity. The total number of species treated in this first part approximates one hundred and fifty. In addition to the 39 kinds treated, the fragment ends with a list of 175 kinds more, which remain for future treatment. In a few instances spaces were left, for additional illustrations, to be supplied. Ordinarily a title is associated with an illustration and a description follows. One chapter, that upon 'The Cocke and Henne,' is elaborated into a treatise upon poultry-raising and fills nearly half the book—similarly as, in the 'Four-footed Beastes,' the chapter on the 'Horse' becomes an essay upon farriery. The 'Batte or Backe or Flittermouse' is included among the birds, and for that there is Scriptural authority.

In reality this is a work upon European, and particularly upon British, birds; but it is intended to be comprehensive, and it makes mention of such American birds as were known to the author. He names seventeen, and his work leaves one to suppose that he had at hand yet others, unnamed, but ready to be included in their appropriate places, in the 'kinds' still to be described,—in the chapters on the Eagle, for example, on the Grosbeak, and on the Owl.

Of the nine drawings of American birds, that of the Towhee is the best; and it is reproduced in the accompanying plate. It came to him, Topsell says, from Richard Hakluyt. Of the remaining eight, four show the subjects lying dead upon their backs—a position approved by Gesner. The colors are lively, as clear and strong, manifestly, as ever they were. Excepting 'The Crane of Virginia,' Indian names only are given; but in each instance the phrase 'of Virginia' (in one, 'of Brasilia') is added; and, with one or two uncertainties, all identifications are sure. These American birds are:

The Aushouetta (= the Thrasher—?)
The Aupseo (= the Bluebird)
The Aiussaco (= the Flicker)
The Artamokes (= the Blue Jay)
The Chuguareo (= the Red-winged Blackbird)
The Chuwheeo (= the Towhee)

The Chowankus (= the female Towhee—?)
The Tarawkow Konekautes (= the Sandhill Crane)

These all are 'of Virginia.' In addition to them, there is pictured, with the blackbird kind, 'a Black-macke of Brasilia' which manifestly is a tanager.

The prospectus at the end, of birds to be treated in subsequent parts, includes eight species more, seven of which, designated by their Indian names, are stated to be of Virginia, and an eighth, the 'Turkey Cocke,' was already known widely in Europe as a barnyard fowl. These additional eight birds are:

Kaiuk, Virginia
Manasscneau, Virginia
Meessenouns, Virginia
Pockway, Poocgueo, Poppogattuweo, } Virginia
Teauh, Virginia
Turkey Cocke

Throughout all his works Topsell relies upon his predecessors, chiefly upon Gesner (1558). In the case of the American birds, however, with the exception of the Turkey, he is a pioneer; for Gesner gives no more than a few vague and fabulous notes about macaws and hummingbirds.[2] Topsell gives to his American novelties names which manifestly are Indian, and some of these are onomatopœic; as, for example, *Chuguareo*, the Red-winged Blackbird; and one of them continues in our established nomenclature,—*Chuwheeo*, the Towhee.[3]

A few quotations will serve to show that the man knew how to write, and they will afford the first vague glimpses of a few familiar birds. The title-page reads:

---

[2] Aldrovandus, to be sure (1599), pictures some twenty-odd birds to which he applies the somewhat vague adjective, *Indicus*. Some of these are fabulous; others manifestly are drawn from specimens; but it would be generous to say of them that as many as a half dozen are recognizable:—the Turkey, yes, and the Cardinal; the Mourning Dove, perhaps; and the Tufted Titmouse, doubtfully.

[3] We have other bird-names derived from bird-notes—Killdeer, Whip-poor-will, Bobolink, Pewee, Chickadee. Some of these names, familiar to our ears, might perhaps be traced back to Indian sources. It interested me, a few years ago when on a walk through the Great Smoky mountains, to discover that the Cherokee Indians called the Chickadee, *Chick-a-ice-leé*.

'The Fowles of Heauen
or
History of Birdes conteyning their
true and liuely figures with the whole
description of their natures in rea-
dings Gramaticall Logicall Phi-
losophicall, Theologicall, Hyero-
glyphicall Medicinall and ciuill.
Together with the Coate armes
of noble Persons who beare
in theire Escutcheons
Fowles or any parte
of a Bird.

'The first Parte.'

The dedication is 'To the Right Hon: Lord Elsmere Lord chauncellor of England one of his highnes most Hon: privy Councell the most noble patron of all good Artes and Father of the *Church* and Cōmon-weale.' And the dedicatory letter contains the following passage of historical interest:

'My writings, especiallie of the livinge Creatures haue nowe passed in the world to a *non plus*. I considered that almost all Nations had bred some learned men, that with industry, Labour and charges, & especially for the glorie of the Grand Creatour, and the benefitt of their Countrymen, had pressed, and written somethinge both of the figures and natures of Gods liuinge Creatures. Although I were the least able of 5000 in England (beinge oppressed in suits of Lawe, & therby empouerished, charged with preachinge an hundred times a yeare for twentie yeares together, and sometimes enfeebled to write thorough a paraliticke righte arme, euen from my birth, yet for the benefitt of my Nation, and the glorie of him, to whome the glorie of all workes, witts, and natures are due, did undertake the taske, and five or six yeares agoe finished the Histories of Beasts and Serpents in some fashion, to my great trauaile, & charges diuulginge them to the world to the Stationers great profitt, and my owne empouerishinge. For (I beseech your Lordship, giue me leaue to say it) they are the men which are rich by makinge schollers poore: and schollers are poore by makinge them riche. And if I

had respected either reward from Patron or Printers, I had utterly failed, and neuer gone further. But my first resolution beinge whetted on, by the daylie verball encouragements of some Lords, Gentlemen, and men of worth, hath prevailed with me, to undertake the third part of liuinge Creatures, The fowles of Heauen, and this greater then both the former by a third parte. The first fruicts whereof I most humblie here offer to your Hon: viewe not printed, but written, neither soe exactly written, figured, and compiled, as I could wishe; but as I could; and yet fitted with all that I had read or obserued, after manie miles trauailes and two yeares labours about these, and a hundred more, which I haue readie beside me to be pressed or suppressed at your Lo^{ps} pleasure. I am bold to presume of your Honors leasure to reade these thinges, for I read this historie of Saint John the Evangelist in Fulgosus, He delighted manie times to play with a tame quaile, and one day a yonge man espyinge him at this recreation, founde fault wth the holie man for an action of such leuitie. The Apostle perceuinge the yonge man had a bowe at his backe, (for a readie answer) bad him shoote twice or thrice at a marke he appointed him, which the yonge man did accordinglie first bendinge his bowe, & then after he had discharged it twice, or thrice he did unbend it againe, The holie man asked him the reason of lettinge downe the bande, He answered. *Vt cum eo vti necesse fuerit, agitationi non ineptum inveniat,* Euen so replied the Euangelist, *Nos honesto studio interdum relaxamur, vt maioribus viribus orationi, et ieiunio sufficere possimus, q^{d} fieri nō posset si semper eodem tenore viueremus.* Pardon me, I beseech you my good Lord allso, for that with Pharaohs Butler I do so late remember Joseph. My former Labours, nor these are worthy of your Patronage: yet, *Insuaues esse solent foetus primi, amoeni magis, & iucundi subsequaces.* The Swan singeth sweetest when he is old, and whitest, and peraduenture my last labours wilbe sweeter then the former; howsoeuer I am sure the subiect is more excellent. And therfore both labour and Author do cast themselues at your Honors feete.'

The Aushouetta (= Thrasher—?), the Aupseo (= the Bluebird), the Auissaco (= Flicker), and the Chowankus (= female Towhee—?) are not described. They are depicted as lying dead. The Artamokes (= Blue Jay) is, in portrayal, the most grotesque

of all: the crest is shown to be divided, and the two parts are directed, one forward, the other backward—a mistake due, it may be supposed, to mutilation incident to the packing and transmitting of the specimen. The description of the Artamokes is as follows:

'This is a Virginia bird, the description whereof I had from Dr. Bonham. It is the thirde kinde of woode-spikers, hauinge a loftie Combe or Creste arisinge highest at the two Corners behinde and before: The colour of the feathers for the most part blewe from the toppe of the Creste unto the rumpe, there are some browne blacke feathers, and it hath also diuers white spottes, the belly is white, the beake and feete blacke. It is not good for meate, bycause it liueth like other Woodspikers, upon flyes spiders and oakewormes. For this thinge onelie the people of the Countrey admire it, and I doubt whether there be any Creature in all the Worlde to paralell it: for it imitateth readilie, all the seuerall voices of other birdes, so as Cleopatra Epiphanius, or Kinge Mithridates. Wch had three and twentie languages, are not to be compared to this siely[4] birde, that can singe wth the thrushe, croake wth the Rauen, crowe wth the Cocke, mourne with the turtle, hisse wth the peacocke, and soe imitate the residue: for wch cause our Countrymen in Virginia doe call it a Linguist, as if it had skill in many languages, and the people of the Countrey call it Artamokes.'

Of the 'Black-macke of Brasilia' (= a tanager) we read that it is 'brought by Marchaunts out of that Country. The body is bigger than the vulgar, hauinge nothinge black upon it except the winges and the taile: and a few black mano feathers. The other partes are more redd then the dye of any scarlett, for no arte of man is able to expresse so perfect and deepe a colour. The feathers are all redd at the bottome. the feete and legges are browne or blackishe ashe colour: the taile very longe, The beake crooked beinge browne on the outside, and of an earth colour in the inside, the clawes short and crooked colored like the legges.'

The Chuguareo (= Red-winged Blackbird) receives the following notice:

[4] *siely*. Changed slightly in form and utterly in meaning, the word is current still: *silly*.

'This is a Virginia bird resemblinge our owsell or blacke bird in quantitye & qualitye: for the beake is of a clay colour & the whole body blacke except the fore part of the winges wch are a deepe scarlett colour as by the picture you may perceiue.'

The Chuwheeo (= Towhee) has been chosen for illustration (see plate X). Of it Topsell says,

'This is also a virginia bird, whose picture I receiued from that worthye, industrious, & learned Compiler of nauigationes, whose prayses will remaine to the worlds end, in the monument of his owne labours, I meane Mr. Hackluyt. But before I sawe this picture I recieued this breife description from Dr. Bonham. Yt is the greatest Virginian pye, hauinge an ashe coloured beake, but all the body head and necke blacke, except the belly & legges, wch are a compound of white & chessnut. The tayle is very longe, like our english cōmon pyes, & haith underneath two white featheres, wch because it is proper to that countrye, I have expressed by that proper name whereby the people there call it.'

And, finally, in connection with 'Tarawkow Konekautes, The Crane of Virginia' we read,

'Peter Martyr writinge of America and the new found Worlde, affirmeth that the Spanyards founde Cranes in Cuba twise so bigge as our vulgar Cranes. and Columbus also, that he sawe Cranes in Lordesta of redd and scarlett couloures in greate aboundance.'

The Appendix includes an introductory paragraph which reads,—

'These Birdes followinge doe also beseache youʳ Lordshippe, that they together with the former may haue their Natures emblazoned to the worlde under your honorable Name. And their unworthy Heraulde shall endeauour with his uttermost skill to expresse in them the wonderfull workes of God, to his unspeakable praise, and the contynuance of youʳ Noble Loue-Learninge vertues amonge all posteritye.'

And a list of names which follows includes the eight American birds noted above.

In vain these birds bespoke the Lord Chancellor's patronage; their herald, unworthy only for politeness's sake, is long since

dead and turned to clay; and now, after three centuries, it becomes a matter of curious discovery that, within seven years following the settlement at Jamestown, a considerable number of American birds had been collected and had received scientific attention.

Sewickley, Pennsylvania

THE RELATION OF LIGHT PERIODICITY TO THE REPRODUCTIVE CYCLE, MIGRATION AND DISTRIBUTION OF THE MOURNING DOVE (*ZENAIDURA MACROURA CAROLINENSIS*).[1]

BY L. J. COLE.

THE PROBLEM.

THE more obvious relations between the annual migrations of birds and certain facts connected with their reproductive cycle are matters of common knowledge. In the northern hemisphere the summer phase of the migratory oscillation is devoted primarily to reproduction—nest building, incubation and rearing of the young. The winter phase, spent in the lower latitudes, is a period of reproductive inactivity. This applies not alone to behavior, for the reproductive organs themselves, and particularly the gonads, are during this period greatly reduced in size and quiescent in function. Modern researches have shown the functioning of the reproductive system and the resulting secondary effects and behavior to depend upon a series of complex endocrine relations, many of the details of which remain, however, to be worked out. What light can this knowledge throw on migration?

Writers on the problems have advanced many theories to account both for the historical inception of migration and for the semiannual stimulus which initiates the northward movement in the spring and the return movement in the fall. While it has not always been done, this question should be kept quite distinct from what is probably the more difficult riddle, namely, how the birds find their way with such relative accuracy from one region to another and back again. There is no need to review all the explanations that have been offered for even the first of these problems. They will be found detailed in the recent works of Thomson (1926) and Wetmore (1930).

[1] Papers from the Department of Genetics, Agricultural Experiment Station, University of Wisconsin, No. 134. Published with the approval of the Director of the Station. This investigation has been supported in part by a grant from the Committee for Research in Problems of Sex of the National Research Council.

It has seemed reasonable that there should be some causal connection between the annual migration and the reproductive cycle but there has been disagreement as to which was cause and which effect. Does the change in the reproductive glands and resulting endocrines provide the stimulus for changed behavior, resulting in the migratory movement; or is migration initiated by some extrinsic cause, and are the resulting structural and endocrinal changes secondary? If the former is the case, what is the stimulus that causes the seasonal enlargement of the gonads in the spring and their atrophy in the fall? And if migration is the primary cause, what are the factors that impel the birds to undertake their semiannual journeys?

The recent illuminating experiments and suggestions of Rowan (summarized in his book, 'The Riddle of Migration,' 1931) have afforded a new approach to this age-old problem. Briefly stated, his results, though not yet very extensive, indicate very strongly that migration is a direct sequence of the gonadal changes and the consequent internal endocrine reactions—birds with enlarging gonads and increasing sexual activity have a tendency to move northward, while those in which the gonads are becoming smaller and the sexual activity is decreasing tend to a southward migration. As a corollary, when the gonads remain *in statu quo* the birds "stay put" in whatever region they happen to be. These propositions need to be put to further test, and doubtless modifications will be necessary in special circumstances, but at any rate they furnish an excellent working hypothesis which seems to fit well not only with the experimental results but also with numerous known facts about the migratory movements of birds.

This throws the problem back to the factors which initiate the pre-seasonal and post-seasonal changes in the gonads, and after showing the inadequacy of other causes, such as changing temperature and food supply, Rowan relates these changes to light periodicity, in other words, to the gradual lengthening of the daylight period in the spring and the corresponding shortening of the days in the fall. His experiments furnish convincing proof of this relationship in the birds he worked with (principally Juncoes) and his results have been confirmed in this respect by Bissonnette (1931) for the European Starling. From further experiments

Rowan concluded it was the period of activity of the birds as determined by the daily light duration which was the effective cause of the gonad changes rather than the direct action of the light itself. Bissonnette's findings are somewhat contradictory on this point and he is inclined to believe the result due rather to the direct effect of light rays of particular wave lengths. The need of more experimentation is indicated. As before suggested, it is possible that different species react in different ways. The Junco is preëminently a migratory bird while the Starling is essentially non-migratory.

THE REPRODUCTIVE CYCLE.

Our interest in this particular problem began from another angle, before the results of Rowan were announced. For some years we have in this laboratory been making an intensive study of hybridization of various species of pigeons and doves and this has meant breeding a good many of the wild species in confinement. The facts which particularly aroused our interest were in connection with the breeding of captive Mourning Doves (*Zenaidura macroura*), and in particular of one female, No. D169.2, which has a long breeding history.

Our birds are kept in a room in which the heat throughout the winter months is maintained as nearly as possible at 70° F. or a little above. While there are lights in the room, the artificial light is seldom used to extend the daylight period, so that the light periodicity is essentially that normal to the season. All birds receive the same feed, which consists of a grain mixture supplemented with cod-liver oil and occasionally with cottage cheese. In this respect it is uniform throughout the year, except that succulent green feed is occasionally added, such as finely chopped carrots, apples, cabbage or lettuce during the winter months and clover or other green leaves in the summer. In this there is some seasonal variation, but it is important to have in mind that all the birds are treated alike. The same applies to all the other operations related to management.

It was early noticed that while the domesticated Ring Doves (*Streptopelia risoria*) were laying more or less regularly all through the year—with a low period at the time of molting in the fall—

the wild species, on the other hand, showed a much more definite seasonal cycle. This was particularly noticeable of the Mourning Doves and this report will be confined largely to them. The history of female D169.2, referred to above, is particularly interesting. This female was purchased in December 1926 from a game farm in Ohio. Her age and early history are accordingly unknown. She has at various times been mated to two different Mourning Dove males and to a Ring Dove, but so far as can be observed the species of her partner has not affected her reproductive cycle, once the pair is well mated. Her history of production with respect to the beginning and cessation of laying each season follows:[2]

TABLE I.

PRODUCTION HISTORY OF FEMALE MOURNING DOVE, D169.2.

Season	*Date of beginning of laying*	*Date of cessation of laying*	*Length of laying season*
1927.....	May 8	July 25	78 days
1928.....	Mar. 11	Aug. 2	144 "
1929.....	Apr. 19	Aug. 6	109 "
1930.....	Apr. 26	Aug. 16	112 "
1931.....	Apr. 13	Aug. 25	134 "
Average.....	Apr. 15	Aug. 9	115 days
Average for 1928–1931..	Apr. 3	Aug. 12	125 days

Taking all five years, it will be seen that while there is considerable variability, this female adhered to a reproductive schedule, in so far as the seasonal cycle is concerned, not greatly different from that of the wild Mourning Doves in this locality, and this in spite of the fact that she did not make a southern migration in the winter, but was in an environment in most respects similar to that of the rest of the year.

The average date at which this female began to lay in the spring is April 15 and the average date of last egg laid in the fall is August 9. It is doubtful whether the first season is strictly comparable to the other since the pair was late in getting started and the male

[2] A study of the egg production and rhythm of the cycle is to be reported separately.

died on August 2. Another male was put with her on August 4 but they failed to mate up that season. It is quite possible that if her former mate had not died she would have extended her laying season. If this season is omitted, the average dates for beginning and cessation of laying are April 3 and August 12, respectively. The difference of these few days is, however, of little consequence in the present connection.

According to Schorger (1929), in Dane County, in which Madison is located, wild Mourning Dove nests with eggs have been found as early as April 18 and as late as September 12. Since nests in the wild may not be found as soon as the eggs are laid, the date of first laying is presumably somewhat earlier than April 18. Similarly, since there is an incubation period of 14 days, eggs might be found for two weeks after they were laid, so the date of last laying may be assumed to be somewhat earlier than September 12. Furthermore, these represent earliest and latest records, respectively, rather than averages, and apply to all observations made and not to a single pair. It may be a fair statement, and sufficiently accurate, to say that in the vicinity of Madison the normal laying period (as distinguished from nesting period) extends from the early or middle part of April to the latter part of August. The time of last laying is undoubtedly largely influenced by the fortuities associated with the late summer brood. If a pair of doves were busy up to the latter part of August with a brood reared from eggs laid early in the month, it is quite likely they would not nest again; but if the earlier nest were broken up or the young died by the middle of the month another nesting would be quite likely.

Similar but less extensive records have been obtained from a few other captive Mourning Dove females. Thus $D261J_2$ and $D261A_3$ were mated up in the early summer of 1931. They laid several sets of eggs during the summer, but both stopped laying about August first ($D261J_2$ last eggs July 27 and 29; $D261A_3$ last eggs July 31 and August 2).

Evidence that the male goes through a cycle similar to that of the female is indicated by the history of Mourning Dove $D261E_2$. This bird was hatched in August 1929 and in the following May was mated to a female white Ring Dove. The history of the eggs

produced by this pair during the two following seasons is interesting and significant (Table II).

TABLE II.

BREEDING HISTORY OF MALE MOURNING DOVE, D261E$_3$, MATED TO WHITE RING DOVE, D356.5.

Placed together in mating cage May 29, 1930; transferred to regular cage, May 31.

Eggs	*Date Laid*	*Fertility Record*
A, B	18, 19 June, 1930	Both infertile
C, D	14, 15 July, 1930	Both fertile
E, F	6, 7 Aug., 1930	Both fertile
G, H	3, 4 Sept., 1930	Both infertile
J, K	4, 5 Oct., 1930	Both infertile
L, M	24, 25 Oct., 1930	Both infertile
N	29 Nov., 1930	Infertile
Q, R	28, 29 Dec., 1930	Both infertile
S, T	24, 25 Jan., 1931	Both infertile
U	22 Feb., 1931	Fertile
W, X	16, 17 Mar., 1931	Both fertile
Y, Z	8, 9 Apr., 1931	Both infertile
A_2, B_2	30 Apr., 1 May, 1931	A_2 fertile, B_2 infertile
C_2, D_2	21, 22 May, 1931	Both fertile
E_2, F_2	12, 13 June, 1931	Both fertile
G_2, H_2	4, 5 July, 1931	Both fertile
J_2, K_2	27, 29 July, 1931	Both infertile
L_2, M_2	19, 21 Aug., 1931	Both infertile
N_2	10 Sept., 1931	Infertile
Q_2, R_2	5, 6 Oct., 1931	Both infertile
S_2, T_2	31 Oct., 1 Nov., 1931	Both infertile
V_2	26 Nov., 1931	Infertile

The first thing to be noted in this table is the difference between the laying history of this Ring Dove female and that of the Mourning Dove previously described. Whereas the Mourning Dove began laying in early April and ceased in early August, producing no eggs in the winter months, the Ring Dove laid more or less regularly throughout the entire year. The irregularity is due in part to the varying lengths of time that the eggs were left in the nest.

Fertility, on the other hand, is definitely seasonal. In 1930 the first eggs produced, three weeks after the pair was put together, were infertile, but the eggs produced in July and August developed

embryos. After this there was no fertility all through the winter months, but a fertile egg was produced on February 22nd, following which all but three eggs were fertile until the last of July, when fertility definitely ceased.

No extensive study has been made of the change in size of the gonads in relation to season, because of the limited number of birds at our disposal. Such incidental records as have been made, however, on birds that died or were laparotomized, show, as would be expected, that both the ovaries and testes decrease greatly in size and become inactive in the winter months, enlarging again in the spring, as is characteristic of most birds. Both Rowan and Bissonnette have shown that similar changes in size and activity are caused by the changed light periodicity.

RELATION TO LIGHT PERIODICITY.

While based on relatively few birds, these observations seem highly indicative of a reproductive cycle in Mourning Doves held captive in Madison closely paralleling that of their wild congeners, free to undertake their annual migrations. Is the annual reproductive cycle an inherent mechanism so deeply impressed on the germ plasm by the regular habits of untold generations of ancestors that it continues to swing through its chronological phases regardless of environmental changes? Or is it, like most physiological processes, conditioned directly or indirectly by some impinging stimulus? A review of the situation eliminated most of the conditions that could be considered seasonally comparable for the two sets of birds. About the only one that remained to which they would be exposed was a change to a longer day in the spring and the reverse of this in the fall. Rowan's results strongly suggested this as a probable controlling factor, and fortunately it was fairly easy to set up a test experiment. Two similar small rooms were accordingly constructed, to be illuminated entirely by artificial light so operated by an electric time switch that the periods of light and darkness could be controlled independently in the two rooms. Other conditions in these rooms are similar and like those in the general loft, that is, they are carried at as near 70° F., or a little above, as possible throughout the winter. Feed and other factors in the management are the same, the only

difference being the controlled light periods. These rooms happen to be numbered 201 and 202, respectively, and may be so designated. A single 60-watt Mazda lamp supplies the light in each room.

Into Room 201 were put on November 29, 1930, the two pairs of birds described fully above, namely Mourning Dove female D169.2 and her Mourning Dove mate, D104B, and Mourning Dove male, $D261E_2$, with his Ring Dove mate, D356.5. Two young birds whose sex at the time was unknown, but which turned out later both to be males, were also put in this room.

In Room 202 were installed two Mourning Dove females, each mated to a Ring Dove male, and two young Mourning Doves whose sexes are as yet undetermined. The two females had both laid through the preceding June and July, but gave no fertility.

For about two weeks after the birds were put in, those in both rooms were given 10½ hours (7 A.M. to 5:30 P.M.) of light and 13½ hours of darkness daily. This was taken as being approximately the mid-winter length of day (including half the twilight period) at about latitude 30°, which may be taken to represent roughly the winter range for the species. Beginning with December 11, the daily light period in Room 201 was increased 45 minutes and held so for a week, being then increased the same amount each successive week until February 26, when this room was getting a "day" of 19½ hours. This was taken to represent about the mid-summer effective daylight period at Madison (latitude approximately 43°). The birds in this room therefore experienced from December 11 to February 26 the range of increase in "effective daylight" period that migrating birds would experience from mid-winter in the South to mid-summer in the North. The light period in Room 202 was left constant at 10½ hours throughout.

The results in the case of the two pairs previously discussed are particularly interesting and significant. Thus Mourning Dove female D169.2 had not laid since August 25. For five seasons she had not begun to lay in the spring until early in April (Table I). This season, however, under the conditions of early increase of "daylight" period in Room 201, she laid on February 4 and 5, and again on February 24 and 25.[1]

[1] This bird died March 16, 1932.

The Ring Dove female, D356.5, had been laying fairly regularly up to the time she and her mate were put in Room 201 (see Table II). Her last egg was laid on November 26, three days before they were transferred. On January 20 she resumed laying and the fact that the eggs were fertile, which they had not been since the preceding July, shows that the Mourning Dove male had also resumed reproductive activity.

It will be recalled that the other two Mourning Doves in this room proved both to be males. $D261C_4$ died on February 4 with no previous indication of being sick and no discoverable lesions. The testes at that time had enlarged to medium size and on sectioning showed indication of active spermatogenesis. The other bird, $D261A_4$, was examined by laparotomy on February 10 and the testes recorded as "large."

Of the birds in Room 202, which has remained on the short day, none has laid up to March 15. Two of these female Mourning Doves laid during June and July, 1931. Furthermore, the Ring Dove mate of one of them has shown evidence of reproductive activity by cooing and coaxing the female in normal fashion.

Again, while the number of birds dealt with is small, the results obtained in the "increasing light" room, compared with previous seasons and with the control room, seem fairly conclusive and tend to substantiate the findings of Rowan and of Bissonnette.

Relation to Migration and Distribution.

The suggestion of Rowan that increasing or decreasing day is the indirect stimulus to migration appears very plausible on the basis of the facts so far obtained. Many subsidiary questions remain, however, to be answered. One of these has already been mentioned, namely, what directs the birds on their northward journey in the spring and southward in the fall? This involves the whole question of migration routes, and while there are doubtless general factors involved, the details differ with different species. Before we can expect to solve these problems we shall require much more detailed and exact information regarding individual migrations. Such information is gradually accumulating for a good many species as a result of bird-banding operations.

Another obvious question involves the dispersal of a species over a breeding range covering a latitude almost as wide as its range of migration. Thus the Mourning Dove in the Mississippi valley winters largely in the southern states at a latitude generally below 35° and migrates northward in spring as far at least as Winnipeg, at latitude 50°. Furthermore, it breeds over this entire range from Texas to Canada. The successive fronts (isepipteses)[1] of the northward migration at 10-day intervals are depicted in Chart I, based on records generously furnished by the Bureau of Biological Survey. These records give the average dates of spring arrival of migrating Mourning Doves, over varying periods of years, obtained from observers scattered at numerous points through the Middle States and southern Canada. It will be noted that while there is a successive pushing forward, the front line for any particular date does not coincide with any parallel of latitude, which, with respect to daylight period, would constitute an "isohemer."[2] Instead there is an early advance in the Ohio valley, succeeded by a later acceleration up the valleys of the upper Mississippi and Red Rivers. If the advance of migration is controlled in anything like a mechanical way by the increasing length of day why do not the isopipteses coincide more closely with the isohemeral parallels? But still more strange, why are not *all* the Mourning Doves in the Southern States, say in February, impelled to move northward to Canada with the advancing season?

The answer to the first question is probably involved in that to the second, and an answer to this is suggested by the breeding in captivity of other wild species of doves. It has been observed that the females of a number of species, for example the Damara Dove (*Streptopelia damarensis*) and the Senegal or Palm Dove (*Stigmatopelia senegalensis*), continue to lay more or less regularly throughout the winter months. These are species whose natural

[1] "In aviphenology, an isochrone of the arrival of migrating birds of any given species in the spring. From ἴσος, equal + ἐπίπτησις, a flying towards. A. Th. von Middendorff, 'Die Isepiptesen Russlands,' Mem. Acad. Sc. St. Petersb. 10, pt. 2, 1859, p. 1–143." I am indebted to Mr. C. F. Talman, Librarian of the U. S. Weather Bureau for this reference.

[2] From ἴσος, equal + ἡμέρα, day.

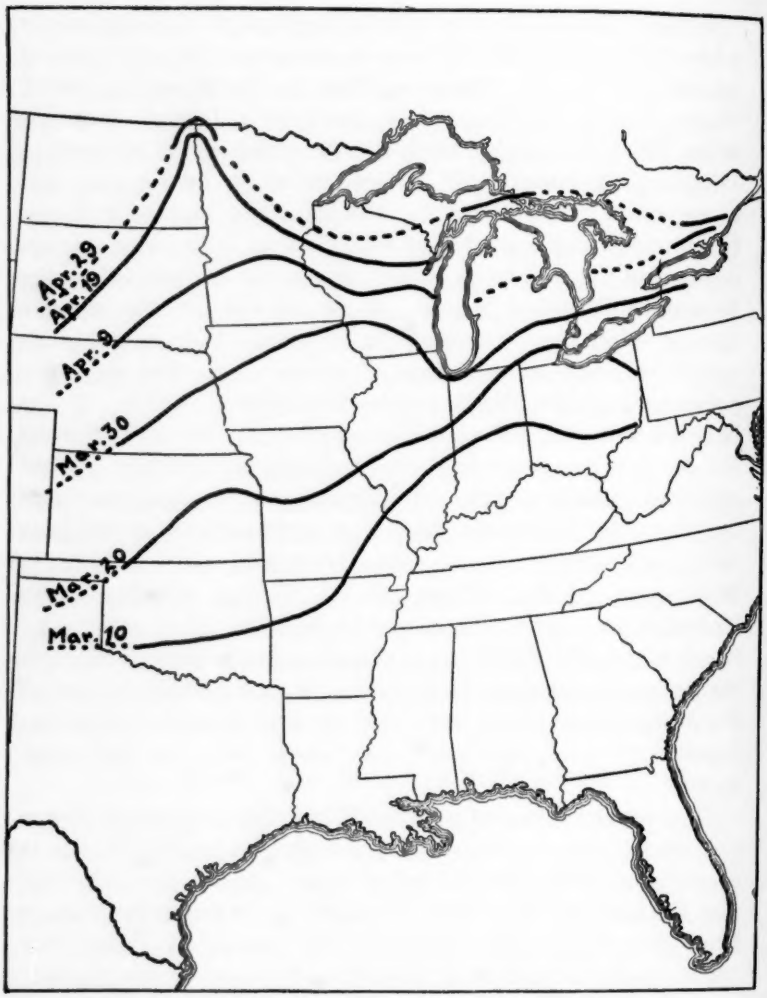


CHART I.—SPRING MIGRATION OF THE MOURNING DOVE.
Average arrival. Based on data from U. S. Biological Survey.

habitat is subtropical and they might be expected, therefore, to be attuned to a shorter day than a bird nesting in the higher latitudes. In other words, there may be a specific genetic differ-

ence in the day lengths to which the reproductive organization of different species respond. Is it not possible that, similarly, within the single species of Mourning Doves there may be a genetic differentiation of geographical groups nesting at different latitudes, in the adjustment of their reproductive response to length of day—some attuned to the shorter days of the South and others to the longer days of the North? In the spring migration then, as the bulk of the species begins its northward movement in response to the lengthening days, those birds genetically attuned to a relatively short day would come into reproductive activity, say, in the latitude of Texas or Oklahoma, and would remain there to breed while the others moved on. In the same way, those birds descended from a stock whose summer home was in Kansas or Missouri or Iowa, and which were responsive to the lengths of day in those respective states, would drop out as they reached their own territories, until finally those which were reared in Canada and attuned to the long summer day of the North would push to the northern limit of the range of the species before ending their migration and settling down to nest. Such genetic diversity in the reproductive-light response would not only account for the wide north-and-south summer dispersal, but would also help to explain the nesting of birds in the same regions in which they were hatched, a fact that has been abundantly attested by banding results. The fact that they do tend to nest in the same region would lead to some degree of inbreeding and tend not only to preserve but to strengthen the regional genetic differences.

It is not to be supposed that such a relatively simple hypothesis will account for all the diverse fact of bird migration and distribution, but at any rate it may serve to explain some of the outstanding features. Fortunately it can be put to test, and this it is proposed to do by securing summer-resident birds from the extremes of their range, as well as from intermediate points, and subjecting them to increasing and decreasing light periods under controlled conditions. If the birds from different latitudes are genetically attuned to different day lengths, their response under the experiment should bring the fact out.

REFERENCES.

BISSONNETTE, T. H.
1931. Studies on the sexual cycle in birds. IV. Experimental modification of the sexual cycle in males of the European starling (Sturnus vulgaris) by changes in the daily period of illumination and of muscular work. *Journ. Exper. Zool.*, **58**: 281–319.

LINCOLN, FREDERICK C.
1930. Migratory status of Mourning doves is proved by banding. *Yearbook U. S. Dept. Agric. 1930*, pp. 386–389.

ROWAN, WM.
1931. The riddle of migration. Williams and Wilkins, Baltimore, 151 pp.

SCHORGER, A. W.
1929. The birds of Dane County, Wisconsin. *Trans. Wis. Acad.*, **24**: 457–499.

THOMSON, A. LANDSBOROUGH.
1926. Problems of bird migration. Houghton Mifflin Co., Boston, xv + 350 pp.

WETMORE, ALEXANDER.
1930. The migration of birds. Harvard Univ. Press, viii + 229 pp.

University of Wisconsin,
Madison, Wis.

NOTES ON THE HAVEMEYER COLLECTION OF CENTRAL AMERICAN BIRDS.

BY LUDLOW GRISCOM.

FOR some years past Mr. Henry O. Havemeyer of Mahwah, New Jersey, has been acquiring collections of Costa Rican birds from Mr. Austin Paul Smith, in fact ever since the late Dr. Jonathan Dwight ceased to be Smith's chief customer. I have had an intermittent but very pleasant correspondence with Mr. Havemeyer, and from time to time he has kindly sent me specimens for examination or identification. With so competent a collector as Smith, it has naturally followed that the Havemeyer collection has become increasingly valuable, that it contains a thoroughly representative series of the avifauna of Costa Rica, and now has a remarkably high percentage of the specialties and the great rarities of the country. Some few of these have already been recorded by Smith (Condor, 1931, p. 249).

In 1927 Smith departed from Costa Rica and went on a trip to Panama. He first made an important and very interesting collection around Port Antonio on the Rio Chepo, Pacific slope of eastern Panama. He then proceeded to the Almirante region on the Caribbean slope of western Panama, where by a remarkable coincidence Wedel was collecting for the Museum of Comparative Zöology and Rex R. Benson was collecting for me in the interests of the American Museum of Natural History. Small wonder that the avifauna of a previously unexplored area of Panama is now quite well known!

Mr. Havemeyer is a busy man of affairs and has little time or leisure for the pursuit of ornithology, so that his collections were never properly determined or worked up and put on record. Last fall (1931) I asked permission to go to Mahwah, examine his collections, and put on record what interesting items it might prove to contain. This suggestion could not have been more cordially received, and no one could possibly have coöperated in more friendly and generous spirit than Mr. Havemeyer. We accordingly spent a very busy but happy day in his museum at

Mahwah early in December 1931. Every single specimen was examined, and all those requiring critical determination were put to one side, and the Panama collections were listed separately. Even working full steam ahead all day, it was not possible to see the entire lot, but the balance were sent to Cambridge during the winter and spring, and all of the specimens requiring critical study were sent immediately.

There is, of course, no point in reporting on the collection as a whole. The notes that follow are divided into three sections. The Costa Rican section is restricted to records of interest based on Carriker's 'Birds of Costa Rica.' The Almirante section is purely supplementary to Peters' recent list (Bull. Mus. Comp. Zool., vol. 71, no. 5, 1931). The collection from Rio Chepo, Darien, is accorded the more extended notice it deserves.

COSTA RICA.

1. **Dendrocygna viduata** (LINNAEUS). Six specimens collected in the marshes near Bebedero, July, 1929. This outlying colony of the species is of considerable interest, as the bird is unknown between northwestern Costa Rica and the Canal Zone. The series does not differ in the slightest degree from South American examples.

2. **Ictinia plumbea** (GMELIN). ♀ June 25, 1927, Suretka Farm, Talamanca. New to Costa Rica, but its occurrence to be expected, as it is common in eastern Central America north of Costa Rica.

3. **Rostrhamus sociabilis plumbeus** RIDGWAY. 1 ad., 1 imm., Bebedero, July, 1929. The Everglade Kite is an excessively local bird in Central America. This second record for the country proves the existence of a small colony in the extensive lagoons and marshes of Guanacaste.

4. **Odontophorus veraguensis** GOULD. For many years my suspicions of this supposed species have been steadily increasing, and I have examined most of the recorded specimens in this country. *O. veraguensis* has no definite range in that all the known specimens are from parts of Costa Rica and Chiriqui, where *guttatus* also occurs. A series in the Havemeyer Collection is particularly instructive, coming from El Copey de Dota. One is typical *guttatus*, 1 is *veraguensis*, and 2 specimens are variously intermediate. I have little doubt that *veraguensis* is a mere local erythrism of *guttatus*. *O. leucolaemus* Salvin is a good example of a distinct species, occurring with *guttatus* in parts of Costa Rica and west Chiriqui.

5. **Odontophorus smithians** OBERHOLSER. Thanks again to Mr. Havemeyer's kindness, the type of this "new species" is before me. It is exactly what I had supposed from reading the original description, a melanism of *O. leucolaemus*, which was first described by Grant in 1893, and a few years later by Salvin and Godman. The specimens of *smithians*

come from the very center of the range of *O. leucolaemus*. This species has long been known to vary remarkably in the amount of white on the throat, the width of the white bars on the black breast, and the degree to which the black areas were continued backward on the pileum and abdomen. One or two birds in the British Museum which were partially melanistic gave Grant the erroneous idea that the "oldest" birds had still more black. Salvin and Godman, however, hesitated to make this assumption, and record several specimens with no white on the throat and no white bars or spots on the breast. In other words the color characters of *smithianus* were described thirty or more years ago and were shown to intergrade completely with the "normal" coloration of *leucolaemus* without regard to locality.

5a. **Haematopus palliatus frazari** BREWSTER. 1 ♂ in fresh plumage, Sept. 29, 1926, Puerto Jimenez. The Oyster-catcher is a rare and little known bird on the Pacific coast of Central America, and recent American commentators on the group, notably Ridgway and Murphy, were unable to examine specimens, and were forced to guess at the subspecies. Murphy, however, showed that Pearl Island specimens were true *palliatus*, a course which I heartily endorse. The Costa Rican specimen before me cannot by any possible chance be referred to *palliatus*. It is darker above, is marked heavily with gray on the under wing-coverts, and has minute spots of white at the base of some of the primaries. The black breast line is barely broken with spots. It will thus be seen that this specimen is intermediate between *frazari* Brewster and *pitanay* Murphy. It agrees, however, exactly with non-typical specimens of *frazari* from various islands off Lower California, and is consequently best referred provisionally to *frazari*. A specimen from Mazatlan, Mexico belongs here also.

6. **Pagolla wilsonia beldingi** RIDGWAY. 2 specimens, Sept. 30 and Oct. 10, 1926, Puerto Jimenez. Previously unrecorded from Costa Rica, but its occurrence was to be expected.

7. **Tringa solitaria cinnamomea** (BREWSTER). Bebedero, March 7, 1926. Unrecorded previously from Central America.

8. **Calidris canutus rufus** (WILSON). ♂, Puerto Jimenez, Oct. 5, 1926. Previously unrecorded from Central America.

9. **Limnodromus griseus griseus** (GMELIN). 3 specimens, Puerto Jimenez, Oct. 10, 1926. The only two records for Costa Rica have never been determined subspecifically. As a matter of fact the western race greatly predominates in Central America.

10. **Crocethia alba** (PALLAS). 1 spec., Puerto Jimenez, Oct. 10, 1926. The Sanderling is unrecorded in Central America south of Guatemala.

11. **Oedicnemus bistriatus bistriatus** (WAGLER). Pair, Tiladelphia, Guanacaste, Oct. 1930. Considered a straggler by Carriker; now known to be resident in the dry savannahs of northwestern Costa Rica.

12. **Gelochelidon nilotica aranea** (WILSON). ♂, Puerto Jimenez, Sept. 29, 1926. There is only one record of the Gull-billed Tern for Central America, at Chiapam, Guatemala.

13. **Chlidonias nigra surinamensis** (GMELIN). ♂ Sept. 29, 1926, Puerto Jimenez. Only one previous record for Costa Rica. The Black Tern is, however, a regular transient on both coasts of Central America.

14. **Scardafella inca dialeucos** BANGS. ♀, La Cruz, Guanacaste, Aug. 18, 1928. Apparently new to Costa Rica.

15. **Claravis mondetoura umbrina** GRISCOM. 1 ♂, San Joaquin de Dota (5000 ft.), Feb. 21, 1931. So rare and little known, that another specimen should be put on record.

16. **Rhinoptynx clamator clamator** (VIEILLOT). ♂, Oja Ancha, Nicoya, Nov. 10, 1929. The third specimen from Costa Rica.

17. **Chloroceryle inda** (LINNAEUS). 1 ♂, Daytonia Farm, Talamanca, June 14, 1927. It is a curious coincidence that there is no previous record for Costa Rica. The species has long been known from Nicaragua.

18. **Crotophaga ani** LINNAEUS. ♂, Cote, Rio Coto, southwestern Costa Rica, Dec. 30, 1931. New to Costa Rica, and unknown on the mainland of Central America north of Panama.

18a. **Notharchus tectus subtectus** (SCLATER). 1 ♂, Santa Rosa Farm, Port Limon, Jan. 22, 1926. A notable range extension. Not previously recorded north of Veraguas, Panama.

19. **Dysithamnus puncticeps puncticeps** SALVIN. 1 ♂, Suretka Farm, Talamanca, June 28, 1927. A second definite record, showing that this form reaches extreme southeastern Costa Rica.

20. **Formicarius rufipectus rufipectus** SALVIN. Four specimens, April–Aug., 192?, Navarro and Guayabo. Only three specimens of this excessively rare Ant-pitta are recorded for Central America.

21. **Grallaricula flavirostris costaricensis** LAWRENCE. 4 spec., San Joaquim de Dota (4000 ft.), Feb., 1931. Only five specimens are recorded from Costa Rica. Mr. Smith is the only man who ever secured these two Ant-pittas in series.

22. **Xenops rutilus septentrionalis** ZIMMER. 1 ♂, Guayabo, April 21, 1926. The third known specimen from Costa Rica.

23. **Todirostrum nigriceps** SCLATER. 1 ♂, Daytona Farm, Talamanca, June 12, 1927.

24. **Empidonax albigularis australis** MILLER and GRISCOM. 1 ♀, Cartago, May 19, 1926.

25. **Tachyphonus rufus** (BODDAERT). 1 ♂, 2 ♀, Suretka Farm, Talamanca, June 27–July 7, 1927. The first definite locality record for Costa Rica.

26. **Petrochelidon albifrons albifrons** (RAFINESQUE). 1 ♂, 1 ♀, Puerto Jimenez, Oct. 16, 1926. The first record of the eastern Cliff Swallow for Costa Rica.

ALMIRANTE REGION.

Mr. Smith collected in this region from late April to August, 1927. Several hundred specimens are referable to 140 species.

For the sake of completeness all species are listed below which are additions to the list recently published by Peters (Bull. Mus. Comp. Zool., vol. 71, no. 5, 1931).

1. **Charadrius semipalmatus** BONAPARTE. Almirante, ♂, ♀, April 18, 1927.

2. **Saucerottia niveoventer** (GOULD). 3 ♂, Bocas del Toro, May, 1927. This hummingbird has never been definitely reported from the Caribbean slope of Central America. The specimens do not differ from a series of nearly one hundred from the Pacific slope of Costa Rica and Chiriqui.

2a. **Chalybura urochrysa isaurae** (GOULD). As is now well known, this rare Hummingbird is apparently confined to the Caribbean lowlands of western Panama, where it has reeently been rediscovered by Benson and Wedel. We naturally speculate on its relationship to *C. melanorrhoa* Salvin, a fairly common bird in eastern Costa Rica, but it is *not* so well known that there is an old record for "Veragua" for this latter species first published, I believe, in 1874 by Mulsant and Verreaux and repeated by Boucard, but ignored by nearly all English and American ornithologists. While I am quite unable to dispose definitely of this old record, a possible explanation is supplied by specimens in the Havemeyer collection. Two at least are typical *isaurae*, but two from Zegla, Terebe River, coll. May 21, 1927 are obvious intergrades between *isaurae* and *melanorrhoa*, as the underparts are green without any tinge of blue, and the under-tail coverts are largely dusky or blackish with white tips and shaft streaks of white. It will be apparent, therefore, that *melanorrhoa* must become a subspecies of *urochrysa* also, and on the evidence available should *not* be included in the list of Panama birds.

3. **Trogon strigilatus chionurus** SCLATER and SALVIN. 1 ♂, Chiriquicito Grande, May 2, 1927. Range extension from the Canal Zone.

4. **Myrmotherula surinamensis pacifica** Hellmayr. 1 ♀, Chiriquicito, May 6, 1927. Known from the Canal Zone eastward. There is an old record for Veraguas.

5. **Sclerurus mexicanus pullus** BANGS. ♂, Almirante, April 19, 1927.

6. **Myiochanes brachytarsus brachytarsus** (SCLATER). 1 ♀, Almirante.

7. **Myiobius sulphureipygius aureatus** BANGS. 1 ♀, Almirante.

8. **Perissotriccus atricapillus** (LAWRENCE). 1 ♂, Almirante, May 16, 1927. The third known specimen of this very rare species from Panama.

9. **Mionectes olivaceus olivaceus** LAWRENCE. 1 ♂.

10. **Dumetella carolinensis** (LINNAEUS). A male taken on the surprisingly late date of April 23, 1927.

RIO CHEPO, DARIEN.

Mr. Smith collected in the vicinity of Port San Antonio, Rio Chepo, from late February to early April, 1927. The importance

of this station is twofold. First, it bridges the gap between the well known avifauna of the Canal Zone and the savannahs near Panama City and the quite different rain forest bird-life of extreme eastern Darien, which is really a part of the Colombian-Pacific Fauna. So far as I know, almost no work has been done at sea-level between the savannahs near Panama City and the Rio Tuyra delta. I stopped at the mouth of the Rio Chiman for two days in 1927, and found the coast forested at this point, obtaining range extensions westward of some of the characteristic species of eastern Darien. It is not generally remembered, however, that Arcé made a brief stop at Chepo before embarking on his highly successful work in Veraguas, but the handful of birds collected were common forest types in the Canal Zone.

We still have, therefore, a faunal problem of some interest awaiting final solution in just this belt between the Canal Zone and eastern Darien. East of the Canal Zone the "rain shadow," restricted to the Caribbean slope of Central America, crosses the continent in a diagonal course. As we proceed eastwards in Darien the rain forest belt extends further and further beyond the mountains until it finally reaches the Pacific coast. At the same time the rainfall steadily increases, and the rain forest on the Pacific slope of extreme eastern Darien is as heavy or even denser than on the Caribbean side of the Canal Zone. At present we do not know the western limits or the limiting factors of the Colombian-Pacific element. Turning now to the arid Tropical Zone, this is a belt of scrub forest or open savannahs which stretches along the Pacific slope from Chiriqui to Panama City. Its characteristic bird-life is excellently covered in a paper by Thayer and Bangs (Bull. Mus. Comp. Zöol., vol. 46, no. 12, 1906, pp. 213–224. The present collection shows that this savannah fauna extends eastward to the Chepo River, and many interesting range extensions were secured. Goldman (Mammals of Panama, p. 5) was at Chepo en route for the Cerro Azul in the interior, and has given us an excellent description of the country, the chief feature of which is the abruptness with which open savannahs give way inland to heavy forest. This explains the presence of both faunal elements in Smith's collection. It still remains to be determined just how far east these savannahs extend. In the lower part of the Tuyra Basin

and the coast near Cape Garachiné, the arid Tropical Zone[1] is an open gallery forest, containing a totally different assemblage of birds from the savannah types of Veraguas and Panama City.

1. **Pilherodius pileatus** (BODDAERT). 1 ♂, Feb. 23. The third record for Panama.

2. **Nycticorax nycticorax hoactli** (GMELIN). ♂, March 11. An exceedingly local bird in Central America, of uncertain status. In Panama it is recorded only from the Canal Zone.

3. **Milvago chimachima cordatus** BANGS and PENARD. Previously recorded from the Pearl Islands and the savannahs near Panama City.

4. **Micrastur mirandollei** (SCHLEGEL). ♂, March 19. A very rare species hitherto unrecorded from the Pacific slope.

5. **Buteogallus subtilis** (THAYER and BANGS). 3 specs., 1 immature. A little known bird. Additional specimens are well worth putting on record.

6. **Monasa morphoeus fidelis** NELSON. 2 specs., March 6. For many years *Monasa similis* Nelson and *M. fidelis* Nelson have been known only from the types, collected by Goldman on the Cerro Azul back of Chepo. The two specimens here recorded prove what I had always suspected from the original description, namely that *fidelis* was an intermediate, connecting *pallescens* Cassin with *grandior* Sclater and Salvin of Caribbean Central America. The comparative characters are as follows.

a. *grandior.* Chin extensively white, malar apex black; foreneck and throat black, passing gradually into grey of breast; wing coverts concolor with back.

b. *fidelis.* Chin with a few white feathers (2 specs.) or black (1 spec.) and malar apex white; throat and breast more extensively black, more sharply demarcated; wing coverts paler than back, intermediate between *grandior* and *pallescens.*

c. *pallescens.* Chin and malar apex always black; throat and breast variable, in large series sometimes as in *grandior*, sometimes as in *similis;* wing coverts much paler than back.

From this key it will be seen that I differ very radically from Mr. Ridgway, who divided the so-called species of this genus into two groups, depending upon whether the malar apex is black or white. Speciation has been greatly overdone in the Nun-birds. It follows that I consider *fidelis* and *similis* to be variations of one subspecies, rather than two distinct species, and *fidelis* having page priority stands. Chapman and others have shown that *sclateri* Ridgway is a race of *pallescens* Cassin, and that *peruana* Sclater is a race of *morphœus.* It follows that I regard all these birds as races of *morphoeus*, without in any way adopting an extreme "formenkreis" point of view. All of the characters separating these birds are either inconstant variables separating the various races, or are inconstant in individuals of one race or another. Excellent examples of distinct species

[1] As defined by Goldman.

in this genus are afforded by *M. nigrifrons*, *M. nigra* (Muller) and *M. flavirostris* Strickland.

To complete these notes on *Monasa*, I might add that excellent modern series of *pallescens* show that the size and color characters of *minor* Nelson from southeastern Panama are matters purely of individual variation, a further example of the degree to which this variability has been used in the past to erect imaginary species.

7. **Myrmeciza exsul occidentalis** CHERRIE. 2 ♂. This race is especially characteristic of the Pacific slope of southwest Costa Rica and western Panama. Its range is here considerably extended eastward.

8. **Synallaxis albescens hypoleucus** RIDGWAY. 1 ♂, 2 ♀. This subspecies is still rare in collections, and would appear to be very local. This is the fourth definite Panama locality; Hellmayr, however, in his monograph of the family, reports "Chiriqui" specimens, and refers other from Cali, Colombia, to this race provisionally.

9. **Deconychura longicauda darienensis** GRISCOM. 3 ♀. These three specimens serve to confirm the validity of the present race, based on the type only from Cana, extreme eastern Darien. It is to be regretted that Mr. Zimmer did not have these four specimens when writing his excellent review of the genus (Field Mus. Nat. Hist., Publ. 257, Zool. Series, vol. 17, no. 1, 1929), and needless to state I accept his major conclusions. Granting, however, his remarks about individual variation in this species, there is no doubt but what the Darien birds average smaller and darker colored throughout than a series of *typica* Cherrie from southwest Costa Rica. Mr. Zimmer is, however, entirely correct in his guess (p. 18) that further Darien specimens might show a lessening of the ascribed differences, provided, I might add, that they came from a less humid area than Cana. The three Chepo specimens do come from a less humid area, and consequently are about 75% typical. In other words this Woodhewer shows exactly the same variation I have already recorded for a long list of rain forest birds in Panama. In the more open forests of western Chiriqui and southwest Costa Rica (Pacific slope) we often have a paler (and sometimes larger) subspecies. A darker and more richly colored bird inhabits the more humid forests of the Canal Zone and in many cases specimens from Cana are minutely darker again with or without racial separation. Exactly parallel cases are the variations of *Odontophorus marmoratus*, *Myrmeciza exsul* and *Henicorhina prostheleuca* in Panama.

10. **Pipra erythrocephala erythrocephala** (LINNÆUS). 1 ♂. This capture confirms the old Rio Chepo record by Arcé, and shows how far west this South American species ranges. Smith also collected *P. mentalis ignifera*, so that these two closely related species must occur together over a considerable area of rain forest in Darien.

11. **Pachyramphus albogriseus** subsp. 1 ♂ imm., March 17. It seems to have been generally overlooked that Festa secured a specimen of this species at Punta de Sabana in the Tuyra delta, the only other record for eastern Panama. This specimen (still I suppose in the Turin Museum)

was regarded by Salvadori as typical *albogriseus*. Needless to say a series, including females, is required for a definite subspecific determination.

12. **Platypsaris homochrous homochrous** (SCLATER). 2 ♂, 1 ♀. The northern limit of this species is the Canal Zone, whence McCleanan sent specimens to Lawrence seventy years ago. I recall no further record from Panama territory.

13. **Sirystes sibilator albogriseus** (LAWRENCE). 1 ♂, 1 ♀, March 19 and 24. There are now apparently 6 known specimens of this very rare species.

14. **Coryphotriccus albovittatus** (LAWRENCE). 1 ♂, March 20. Another excessively rare bird, now known from five specimens. This is the second record for Panama, and over seventy years has elapsed since the types were collected by McCleannan.

15. **Aphanotriccus audax** (NELSON). 1 ♂, 1 ♀, March 16 and 23. The third time this species has been collected, and the first time away from the type locality (Cana, eastern Darien). There were originally three specimens, identified at the American Museum of Natural History, and Mr. Havemeyer presented them with one, which I have not seen.

16. **Myiophobus fasciatus furfurosus** (THAYER and BANGS). 2 ♂. Now known to occur generally from southwestern Costa Rica to the Rio Chepo, Darien in open scrub; also on the Pearl Islands, where Crosby and I found it in 1927.

17. **Phylloscartes ventralis flavovirens** (LAWRENCE). 1 ♂, March 15. The second known specimen, originally determined at the American Museum of Natural History, where it was compared with the type.

18. **Tyrannulus elatus panamensis** THAYER and BANGS. 2 ♀. Another species of dry open scrub, which has not been encountered very often in Panama.

It may be noted in passing that Mr. Smith secured every single one of the very rare Tropical Zone *Tyrannidae* of Panama at one locality in the course of one brief collecting trip, a feat which has never been duplicated in Central America.

19. **Thryophilus rufalbus castanonotus** RIDGWAY. 2 ♂, 2 ♀.

20. **Thryophilus modestus elutus** BANGS. Series of 6.

21. **Pheugopedius rutilus hyperythrus** (SALVIN and GODMAN). Small series.

In all three cases, species of the Arid Tropical Zone, reaching their eastern limits on the Rio Chepo.

22. **Hylocichla ustulata swainsoni** (TSCHUDI). 1 ♂, March 17. An early date for this transient.

23. **Smaragdolanius pulchellus viridiceps** (RIDGWAY). 1 ♂, March 13. One of the few records for this little known subspecies.

24. **Hylophilus ochraceiceps nelsoni** (TODD). 1 ♂, March 14. A little known bird, now known to occur in the coastal forests of the Pacific slope of Panama from Veraguas (Griscom) to the Rio Chepo, Darien.

25. **Hylophilus viridiflavus** LAWRENCE. 1 ♂, 2 ♀. A characteristic species of low scrub in the Arid Tropical Zone, now known to be quite common from Veraguas to the Rio Chepo, Darien. It is much less common in western Chiriqui and adjacent Costa Rica.

26. **Helmitheros vermivorus** (GMELIN). 1 ♂, March 16. The southernmost record for this winter visitant.

27. **Vermivora pinus** (LINNAEUS). 1 ♂, March 7. New to Panama.

28. **Tangavius aeneus involucratus** LESSON. 1 ♀, March 17. The Red-eyed Cowbird is wearisomely abundant through most of Central America, but decreases near the southern limits of its range. I found it a very uncommon bird in Veraguas, and there are no definite records further south and east.

NOTES ON *Ramphocelus dimidiatus* LAFRESNAYE

One of the commonest and most brilliantly colored birds of the lowlands of Panama is this beautiful Silver-beak Tanager. It is surprisingly variable in narrow limits, and the various subspecies proposed are poorly or well thought of depending upon the excellence of the material available. Matters have been at a standstill for some years due to the grotesque and incomprehensible ranges assigned to various races by their proposers. As at present understood, typical *dimidiatus* is a Colombian species ranging into eastern Panama, and north along the Caribbean coast to Chiriqui (Ridgway, Birds N. & Mid. Amer., vol. 2, 1902). Ridgway, however, described *isthmicus* from the Caribbean slope of the Canal Zone, thus cutting the alleged Panama range of *dimidiatus* in two. Furthermore he did nothing with the abundant records from the Pacific slope of western Panama, leaving these birds nameless! His treatment included *limatus* Bangs from the Pearl Islands, based on abundant material, but his ascription of *dimidiatus* to the Caribbean coast of Chiriqui was not based on specimens. In the meantime Bangs acquired a series from western Chiriqui and a matchless series from the Canal Zone and the vicinity of Panama City. He regarded the former as true *dimidiatus* and the latter as *isthmicus*, a valid race. A year or so later the American Museum obtained 4 specimens collected by J. H. Batty on Coiba Island. This institution possessed no satisfactory material for comparison at that time, but the late W. deW. Miller catalogued these birds as *limatus ?*, and years later pointed out to me their peculiarities. Between 1924 and 1927 I collected this Tanager in Chiriqui, Veraguas, Darien and the Pearl Islands, these specimens now in the American Museum of Natural History. For some years, therefore, I have been awaiting adequate material and the opportunity to review the races of this Tanager. The Museum of Comparative Zoology now possesses excellent series as well as three out of four types, and my conclusions are submitted below. I am much obliged to the Amer. Museum of Natural History for the loan of critical specimens.

1. **Ramphocelus dimidiatus dimidiatus** LAFRESNAYE, 1837, Cartagena, Colombia; types in Mus. Comp. Zool. examined. Typical *dimidi-*

atus is a relatively small bird, with a tendency in males to the bright crimson areas being slightly darker in shade. The bill of adult males has the maxilla blackish and the mandible light bluish gray in dried skins. The black abdominal patch is very variable in large series. Ordinarily it is a more or less broad stripe down the center of the belly, and expanded forward into a distinct patch across the center of the abdomen. In about one-third of the series, however, this patch is greatly reduced or wanting. Adult females are appreciably darker and brighter colored, especially above, the head and throat also blacker. I am quite unable to see any constant differences in series from various parts of Colombia, and specimens from both sides of extreme eastern Panama are obviously true *dimidiatus*. Westward its exact limits remain to be determined, but they will probably coincide with the areas of heavy rain forest. In spite of the range assigned by Ridgway cited above, the species is unknown on the Caribbean coast of Panama west of the Canal Zone, nor are there any old records.

2. **Ramphocelus dimidiatus isthmicus** RIDGWAY, 1901, Frijole Station, Canal Zone. The fine series now available does not endorse the color differences assigned to adult males. It is true that extreme specimens are minutely less pure red, the rump tending to be more scarlet, less crimson. These differences, however, apply to about one-third of the material only. The browner rather than blacker abdominal patch is true of *only four* birds out of 25. Adult females are, however, lighter and duller colored throughout, the head and throat being browner, less blackish. The tail is notably longer in both sexes. This race is by no means confined to the Canal Zone, but ranges east at least as far as the Rio Chepo, and west to Veraguas, where it occurs locally in the open savannah country, and more numerously in the heavy forest at the base of the mountains. These latter are not typical, however, and approach the next subspecies.

3. **Ramphocelus dimidiatus albirostris** subsp. nov.

Type, No. 108,397, Mus. Comp. Zool.; ♂ ad.; Divalá, Pacific slope of western Chiriqui; Nov. 13, 1900; W. W. Brown.

The measurements of this new race average about the same as in *isthmicus*, with a broader and heavier bill, and instantly separable in the strikingly paler and lighter bill. In the adult male, the mandible is bluish gray for the basal half, and the maxilla is ivory white except for the abruptly black tip. There is only one specimen which is not obviously different. In the female both maxilla and mandible are usually extensively bluish gray basally, instead of wholly blackish as in *dimidiatus* and *isthmicus*. It should be noted that the series of all three races used in comparison were collected by the same man, W. W. Brown, within 3 years, 1898–1900. In other color characters the new form is intermediate between *dimidiatus* and *isthmicus*, but rather nearer the former. It is restricted to the coastal forests of the Pacific slope of western Panama, intergrading in Veraguas with *isthmicus*.

4. **Ramphocelus dimidiatus limatus** BANGS, 1901, San Miguel Island, Bay of Panama [= San Miguel on El Rey, the largest of the Pearl Islands]; type in Mus. Comp. Zool. examined. In size resembling *dimidiatus* rather than *isthmicus;* adult male paler, more scarlet, less crimson than *dimidiatus*, the abdominal patch greatly restricted or more rarely obsolete; female minutely paler and duller than *isthmicus*. The modifications from the original description in the characterization above are due to the fact that the bulk of the series now before me was not collected until 1904, when further specimens of *isthmicus* were also received. Four males from Coiba Island are quite inseparable from *limatus*, but females should be carefully compared before a final determination.

MEASUREMENTS OF ADULT MALES.

	Wing	Tail
dimidiatus	74.5–80 (77.25)	65–71 (68.0)
isthmicus	76–81 (79.15)	70–76.5 (73.5)
albirostris	78–80.5 (79.0)	69.5–74 (71.6)

MATERIAL EXAMINED.

Colombia:

Bogotá.—2 ♂, 2 ♀; Cartagena, the types.

Santa Marta.—34 ♂, 21 ♀.

Pacific slope.—4 ♂, 2 ♀.

Panama:

Darien, Permé (Caribbean slope), 3 ♂, 12 ♀.

Darien, Cana and Mt. Sapo (Pac. slope), 4 ♂, 4 ♀.

Darien, Rio Chepo (Havemeyer Coll.; *isthmicus*).

Canal Zone (Lion Hill, Caribbean slope) and Panama City, 25 ♂, 12 ♀ (*isthmicus*).

Pearl Islands, 32 ♂, 9 ♀ (*limatus*).

Veraguas (in A. M. N. H.):

Wilcox Camp, 2 ♂, 2 ♀ (*isthmicus* approaching *albirostris*).

Coiba Isl: 4 ♂ (apparently *limatus;* in A. M. N. H.).

Chiriqui (Pacific slope) (Divalá and David), 9 ♂, 9 ♀; Boqueron, 1 ♂, 2 ?; Remedios, 2 ♀ (in A. M. N. H.).

Museum Comp. Zoöl.,
Cambridge, Mass.

SPEED OF BIRD FLIGHT.

COMPILED BY MAY THACHER COOKE.

DEFINITE records of the speed of bird flight are sometimes hard to find. Quite a few such records exist; but they are scattered, many in publications not readily accessible. In order to facilitate further study of this interesting subject it seems desirable to bring together these records for North American species, where they will be readily available.

Scattered through sportsman's magazines are many so-called records of the speed of game birds, most of which are estimates based on calculations that were at best largely guess work. In recent years, however, the air-speed indicator and automobile speedometer have given means by which individuals of many species have been definitely timed. Also studies have been made of birds flying across measured distances, timed by stop watches and theodolites. These are furnishing a fairly definite understanding of the rate at which birds of different kinds fly, and in general the speeds so determined are much lower than was formerly supposed.

Some of the smaller Passeres have been found to make less than 20 miles per hour in ordinary flight, and records of ducks and geese averaged little over 40 miles per hour. At the other extreme is the hunting Peregrine. Portal, an experienced falconer, estimates this bird's average maximum speed of level flight through still air as 62 miles per hour, and some have estimated that it strikes its prey at 150 miles per hour. McLean timed a Duck Hawk hunting over a 400-yard field in California, whose average speed was over 165 miles per hour and whose greatest speed was 180 miles per hour. Extreme as these speeds seem, they are possibly exceeded by some of the Swifts.

Ten years ago Col. Richard Meinertzhagen published in 'The Ibis' a very comprehensive article in which he collected and analyzed the available information on this subject. He reported, as the experience of aviators, that geese can accelerate very little, but that ducks when pressed can speed up to about 60 miles per

hour. He concluded that birds have two speeds, "a normal rate which is used for every-day purposes and also in migration, and an accelerated speed which in some cases nearly doubles the rate of their normal speed." This accelerated speed, however, cannot be maintained for any length of time.

Several recent articles on the mechanics or aeronautics of bird flight are not included in the following annotated bibliography which shows the sources and nature of the material summarized in the appended table.

BASSETT, FRANK N.

1921. The Speed of a Flying Dove. Condor, vol. 23, p. 190–191.

[BRUETTE, WILLIAM].

1917. Birds and Aviators. Forest & Stream, vol. 87, p. 603. (Ducks average 65½ miles per hour when flying upwards; 69 miles per hour when flying horizontally [air speed?].)

CLARKE, W. EAGLE.

1912. Studies in Bird Migration. London, Gurney & Jackson, 2 vols. 8vo. II. p. 29. (Records of skylark and starling.)

CLAYTON, H. HELM.

1897. The Velocity of a Flight of Ducks obtained by Triangulation. Science, New Series, vol. 5, p. 26. (The Height and Velocity of the Flight of a Flock of Geese migrating northward. Ibid. p. 585–586. Measured by theodolites.)

GLADSTONE, HUGH S.

1922. Record Bags and Shooting Records. London, H. F. & G. Witherby, 240 pp., 8vo. (Chapter, "The Speed of Birds," p. 173–197, quotes many published records and discusses the effect of wind on speed of flight.)

GRINNELL, GEORGE BIRD.

1881. Flight of Birds. Forest & Stream, vol. 17, p. 247. (Data for pigeons.)

1901. American Duck Shooting. New York, Forest & Stream Publishing Co., 623 pp., 8vo. p. 509–510. (A flock of Pintails flew some distance parallel to a train going 52 miles per hour.)

1903. Timing the Flight of Birds. Forest & Stream, vol. 41, p. 375. (Data for pigeons, pintail, and starlings.)

HARRISSON, T. H.

1931. On the Normal Flight Speed of Birds. British Birds, vol. 25, p. 86–96. (Speeds carefully timed by auto or motorcycle speedometer. Data for 36 species. Bibliography.)

HAYES, SAMUEL P., JR.

1929. Speed of a Flying Hummingbird. The Auk, vol. 46, p. 116.

HOLLAND, RAY P.

1924. How Fast Can a Quail Fly? Outdoor Life, vol. 53, p. 70. (Aviators say that at 65 miles per hour they can overtake the fastest ducks.)

How Fast Can a Quail Fly? Ibid., p. 151. (Timed with stopwatch from time bird flushed until second barrel was fired; estimated about 48 miles per hour.)

JONES, LYNDS.

1927. Highway Mortality and Speed of Flight. Wilson Bulletin, vol. 39, p. 8–10. (Long-billed Curlew and flock of gulls timed by auto.)

LONGSTREET, R. J.

1930. Notes on Speed of Flight of Certain Water Birds. The Auk, vol. 47, p. 428–429. (Twelve species timed by auto speedometer.)

MARTIN, EDWARD T.

1916. The Speed of Ducks. Forest & Stream, vol. 86, p. 1147. (Diving ducks faster than puddle ducks; teal not so fast as Canvasback and Scaup.)

MCLEAN, D. D.

1930. The Speed of Flight in Certain Birds. The Gull, vol. 12, no. 3. (Discusses the speed of 13 species timed by auto speedometer.)

MEINERTZHAGEN, RICHARD.

1921. Some preliminary remarks on the Velocity of Migratory Flight among Birds, with special reference to the Palaearctic Region. Ibis, p. 228–238. Reprinted in Smithsonian Report for 1921, p. 365–372. (The most comprehensive discussion of the subject.)

MUNSON, EDWARD L.

1930. Timing the Ducks. Field & Stream, vol. 35, p. 18–20, 70. (Tests made by airplane, chasing ducks; i. e. gives the maximum speed of which the birds were capable; five species.)

[MURPHY, WILLIAM W.]

1905. How Fast do Birds Fly? Forest & Stream, vol. 65, p. 330. (Engineer of fast train has raced birds flying parallel to or ahead of his engine; five species.)

PHILLIPS, JOHN C.

1922. A Natural History of the Ducks. Vol. I, p. 22–23. (Some diving ducks faster near ground than Mallard-like species. Extra speed of teal more apparent than real. 40–50 miles per hour, common speed in migration; 55–60 miles per hour possible by some species.)

PORTAL, C. F. A.

1922. The Speed of Birds. Field (London), vol. 139, p. 233–4. (Speed is partly individual, one partridge of a covey was seen to fly 15 per cent faster than the others when all were at full speed. Author, an experienced falconer, gives average maximum speed of level flight through still air of seventeen species.)

E. P. R.
1913. How Fast Do Ducks Fly? Forest & Stream, vol. 80, p. 41. (Conductor said train often raced ducks and at 50 miles per hour the train usually won.)

RADCLIFFE, C. E.
1922. The Speed of Birds. Field (London), vol. 139, p. 234. (The heaviest bird of a given type is the fastest when it gets going. Quicker flush and rise of smaller bird deceptive. No bird can beat a Peregrine Falcon.)

RITTER, C. B.
1910. Speed of Birds and Animals. American Field, vol. 73, p. 200. (Observations of a locomotive engineer.)

ROBINSON, H. W.
1922. What is the Fastest Bird? Field (London), vol. 139, p. 138. (Considers Merganser going down wind one of the fastest of all birds.)

WETMORE, ALEXANDER.
1916. The Speed of Flight of Certain Birds. Condor, vol. 18, p. 112–113. (Seven species timed by auto speedometer.)

WHITE, FRANCIS BEACH.
1927. Birds and Motor Cars. The Auk, vol. 44, p. 265–266.
1929. Birds and Motor Cars. The Auk, vol. 46, p. 399. (Speeds of thirteen species of Passeres.)

WOOD. HAROLD B.
1923. The Speed of Flight of Birds. Bird-Lore, vol. 25, p. 121. (Records of eight species timed by auto speedometer.)

Species	M.p.h.	How timed	Locality	Authority	Remarks
Gulls, sp.	25	Boat	Irish Sea	Gladstone	Accompanied mailboat without effort.
" "	30	Auto	California	Jones	Flock of 12 paced for half an hour.
Herring Gull	17–20	"	England	Harrisson	Three observations; very easy flight.
" "	12	"	"	"	Planing near ground for 50 yards.
Common Tern	25, 27	"	"	"	Easy flight.
Black Skimmer	18	"	Florida	Longstreet	Two birds over 3 miles, wind ahead.
Gannet	25	"	"	"	Four birds, wind ahead.
"	48	Airplane	England	Meinertzhagen	Air speed.
Cormorant	20	Auto	Florida	Longstreet	Four birds, wind ahead.
Brown Pelican	26	"	"	"	Four birds for 8 miles, wind abeam.
Ducks, sp.	47.8	Theodolites	Mass.	Clayton	Light wind.
" "	47½	Kites & Stop watch	N. J.	E. P. R.	Ordinary flight, average of 20 observations.
" "	44	Train	Missouri	Murphy	Hunter pumping repeating gun.
Mallard	50	Airplane	?	Meinertzhagen	Air speed.
"	50–	"	France	"	" "
"	58	?	England	Portal	Average maximum speed of level flight through still air.
"	55±	Airplane	California	Munson	Flock chased, top speed. Air speed.
Cinnamon Teal	32–59	Auto	"	McLean	Bird speeded to higher speed, another 49 miles per hour.
Shoveler	47, 53	"	"	"	Two different birds, easy flight.
Pintail	65±	Airplane	"	Munson	Flock chased by plane. Air speed.
"	55	Train	Arizona	Grinnell	Flock drew away from train
Redhead	42	"	Colorado	Ritter	Flew near train for 50 miles.

Species	M.p.h.	How timed	Locality	Authority	Remarks
Canvasback	72±	Airplane	California	Munson	Flock chased, top speed. Air speed.
Goldeneye	50−	Train	New York	E. P. R.	Train at 50 miles per hour passed in ½ mile flock that had been shot at.
Snow Goose	50±	Airplane	California	Munson	Flock chased, top speed. Air speed.
Canada Goose	44.3	Theodolites	Mass.	Clayton	Light wind.
Brant	45	Airplane	Scotland	Meinertzhagen	Air speed.
Swan	45±	"	California	Munson	Flock chased, top speed. Air speed.
Great Blue Heron	28	Auto	"	Wetmore	Two observations.
Green Heron	34	Auto	California	McLean	Steady, easy flight, 25 ft. alt.
Long-billed Dowitcher	43	"	"	"	Five birds in easy flight, 200 yards.
Semipalmated Sandpiper	32	"	Florida	Longstreet	Flock, wind abeam.
Western Sandpiper	44, 52	"	California	McLean	Two birds, level flight.
Sanderling	41	"	Florida	Longstreet	Wind behind, about 10 miles per hour.
Willet	27	"	Florida	"	Wind ahead.
Long-billed Curlew	35	"		Jones	For ½ mile, bird tried 3 times to alight.
Hudsonian Curlew	34	"	Florida	Longstreet	Two birds for 7 miles, wind abeam.
Black-bellied Plover	24	"	"	"	Wind abeam.
Golden Plover	62	Train	Illinois	Martin	Beat with ease train going 58–62 miles per hour.
Killdeer	28–55	Auto	California	McLean	Individuals vary greatly; 3 observations, fastest seemed to be playing in air.
Semipalmated Plover	32	"	Florida	Longstreet	Flock, wind behind.
Bobwhite	48	Stop watch	South Carolina	Holland	Birds flushed, top speed.

Species	M.p.h.	How timed	Locality	Authority	Remarks
Ruffed Grouse	22	Auto	New Hampshire	White	
Mourning Dove	30	"	California	Bassett	Bird frightened.
" "	32	"	Kansas	Wood	
Turkey Vulture	21	Train	Missouri	Murphy	
Western Redtail	22	Auto	California	Wetmore	
Swainson Hawk	15	"	Kansas	Wood	
Duck Hawk	165–180	Stop watch	California	McLean	Hunting
Peregrine Falcon	62		England	Portal	Average maximum level flight through still air
Eagle				Murphy	When chased can beat train.
Sparrow Hawk	22–25	Auto	California	Wetmore	Two observations.
Kingfisher	36	"	"	McLean	Steady flight apparently little effort.
Flicker	20–25	"	New Hampshire	White	Two observations.
Red-shafted Flicker	43, 44	"	California	McLean	Slightly startled.
Ruby-throated Hummingbird	45	"	Pennsylvania	Hayes	200 yards, easy flight.
Scissor-tailed Flycatcher	10	"	Kansas	Wood	
Kingbird	15	"	New England	White	
Arkansas Kingbird	17	"	Kansas	Wood	
Horned Lark	23–28	Auto	California	Wetmore	Six observations.
" "	17, 23	"	Kansas	Wood	Two observations.
" "	32, 54	"	California	McLean	Two observations. Slower in ordinary flight.
Magpie	19	"	England	Harrisson	
Blue Jay	20	"	New England	White	
Raven	24	"	California	Wetmore	

Species	M.p.h.	How timed	Locality	Authority	Remarks
Crow	60–		New York	Martin	Could just about keep up to train going 58–62 miles per hour.
Starling	35–40	Boat	North Sea	Clarke	Migrating birds.
"	18	Auto	New England	White	
"	44		England	Portal	Average maximum level flight through still air.
"	40–45			Grinnell	Going to roost.
"	43–49	Stop watch	India	Meinertzhagen	13 observations.
"	25–30½	Auto	England	Harrisson	7 observations.
"	45–48½	Theodolites	Palestine	"	22 observations.
"	46.5	?	Germany	"	
Tri-colored Blackbird	46–52	Auto	California	McLean	46 and 48 to and from nest. Flock flew at 52 miles per hour.
Meadowlark	20	"	Kansas	Wood	
Baltimore Oriole	12	"	"	"	
" "	26	"	New Hampshire	White	
Bronzed Grackle	27, 30	"	" "	"	2 observations.
Vesper Sparrow	17	"	" "	"	
Savannah Sparrow	37–42	"	California	McLean	First speed apparently easy, second maximum.
Song Sparrow	17	"	New Hampshire	White	
Indigo Bunting	20	"	" "	"	
Barn Swallow	44–46	"	California	McLean	Easy flight.
Bank Swallow	31	"	England	Harrisson	Chased by car
Shrike	28	"	California	Wetmore	
Catbird	16	"	New England	White	
Robin	20–32	"	" "	"	8 observations.
Bluebird	17	"	" "	"	2 "

THE FIRST APPEARANCE AND SPREAD OF THE BREEDING RANGE OF THE EUROPEAN STARLING (STURNUS VULGARIS) IN OHIO.

BY LAWRENCE E. HICKS.

ON February 7, 1919, the writer captured a live specimen of the European Starling (Sturnus vulgaris) at Fredericktown, in Knox County Ohio. The bird appeared either sick or greatly weakened due to exposure to cold and was found perching upon the railing of the fire escape of the old Baptist Church building located on the eastern side of the public square of the village. After a number of attempts, the bird was finally captured. It appeared to revive somewhat after being in a heated building for a few hours but on the morning of the 8th, was found dead.

As the writer at that time had not learned to prepare bird skins, only the wings were saved. These are now at the Ohio State Museum at Columbus and perhaps represent the second Ohio collected specimen of the species. The first known record of the species west of the Allegheny mountains was a bird taken at West Lafayette, Coshocton County, Ohio in January 1916. Starlings had been released, however, at Cincinnati, Ohio, in 1872 and on several subsequent occasions, but no reports were ever received from any of these birds.

Mr. S. V. Wharrum of Austinburg, Ashtabula County, reports that he has observed the species every year since 1919, his first record being obtained late in 1918. It is altogether possible that the species had made its appearance during the winter months in many localities in the northeastern quarter of Ohio previous to the year 1920, as many observers in other localities overlooked the species for a considerable time after it was known to be fairly well established.

The next starling record was obtained May 11, 1920 when 6 individuals were seen near Belleville, Richland County. On May 21, 1920, groups of 2, 5, and 3 birds were seen in the vicinity of a grove of sugar trees three miles northwest of Belleville. The birds appeared to be nesting in the vicinity but it was not until

June 2, 1920 that I was able to return to the grove and verify the fact. Three tree cavities at heights of about 45, 60 and 65 feet proved to be occupied by nests. Two of the nests were inaccessible but one was successfully reached and the young birds observed at close range. The adult birds were also watched for a time and some notes taken concerning their regular trips to the grove bringing food.

During the 1921 season no less than 6 pairs of starlings nested in the grove and 2 other pairs were found nesting along Clear Fork Creek near Lexington. In 1922, at least 11 pairs nested in the grove and several other pairs were found nesting in the vicinity, at Lexington, near Mansfield, at Butler and near Gatton Rock, all in Richland County.

The second Knox County record was obtained on Aug. 14, 1920 when 21 birds were observed just west of Fredericktown. Flocks of 18 and 38 were seen in the same locality on Aug 19 and Aug. 23 and a group of 7 near Chesterville, Morrow County, on Aug. 29. Also 12 birds were recorded near Chippewa Lake, Medina County, on Aug. 8, 1920.

During 1921 small flocks of starlings were observed in July near the Wooster Experiment Station, Wooster, Wayne County; near East Palestine, Columbiana County; west of Cambridge along the Old National Road, Guernsey County and near Bridgeport, Belmont County. In addition, 12 pairs were found nesting within 3 miles of Fredericktown, 2 pairs near Ankneytown, and at least a half-dozen pairs near 'The Caves' at Millwood, Knox County. A single pair also nested in a grove along the Mohican River near Loudenville, Ashland County.

The first starling record for the Columbus region was obtained by C. F. Walker and E. S. Thomas on October 20, 1921, a single bird being seen flying about a barn a few miles south of Columbus. Another single bird was observed by Mr. Walker on Sept. 18, 1922, near Carrol, Fairfield County, Ohio.

During 1922, the writer again found starlings nesting in Richland, Ashland and Knox counties and new breeding records were obtained from Walhonding, Coshocton County; Johnsville, Williamsport and Chesterville, Morrow County; Utica, Licking County and Lakeville, Holmes County. The total number of

starlings seen in 1922, including many small flocks in July, August, September and October, probably did not exceed 600.

During 1923, new breeding records were obtained from Galion, Crawford County; Sparta, Morrow County and Croton, Johnstown and Granville, Licking County. During October 1923, starlings were first observed at Westerville, Franklin County; Sunbury, Delaware County; Marion, Marion County; Defiance, Defiance County; Continental, Putnam County; Napoleon, Henry County and at Bowling Green, Wood County. Several flocks of from 50 to 200 birds were seen in Knox, Morrow and Richland counties in late July and August, perhaps a total of nearly 2000 birds being seen during the whole year.

In 1924, at least 25 pairs of starlings nested in small sugar groves in the vicinity of Westerville, Franklin County, and other observers reported numbers of immature birds elsewhere in the county. Other nests were observed at Sunbury and Powell, Delaware County. Starlings were found nesting at all of their former locations that were revisited and in most cases there was a marked increase in the size of the nesting groups, with frequently an additional pair or two nesting in some adjacent grove of trees. A great variety of nesting sites was chosen but by far the greater number was found in cavities in the dead tips of sugar maple trees. Perhaps this accounts in part for the fact that the species became more abundant and established itself as a summer resident at an earlier date on the whole in sections where beech-maple was the predominate forest type, many of the oak-hickory and other forest type sections still having rather sparse starling populations during the nesting seasons. Stream bottom areas with many large cavity-bearing trees such as sycamores and elms were also early invaded.

During the months of July and August of 1924, flocks of starlings were seen almost daily, many flocks being of considerable size. The birds were rarely observed feeding in the vicinity but appeared to be of an extremely restless nature and uneasy as though disturbed by some migratory urge.

On Aug. 14, 1924, I observed my first large flock of starlings at Fredericktown, Knox County, Ohio, a group carefully estimated to consist of about 1800 to 2000 individuals. The birds spent

most of the time between 4 P.M. and 7:30 P.M. upon the wing, splitting up into numerous groups, then collecting together again into one noisy, garrulous mass of flashing streaks, swirling and gyrating, first climbing and then dipping, several hundred flying together in formation as one individual, then discarding their rhythmical flight, splitting into numerous smaller groups and continuing in a score of diverse directions. At times the flock would be divided into four or five groups, each flying parallel with the ground but at a different height and in a different direction. These elaborate maneuvers presented a striking pattern against the sky. Several times at later dates, I have observed the same phenomenon but I have never been fortunate enough to witness again an aerial display of such unusual appearance. Even counting this large flock, probably not more than about 4500 birds were observed during the year of 1924.

During 1925 a gradual increase in the species was noted in all localities. It is my opinion that the species had certainly made its appearance in every one of our Ohio counties by the year 1925, perhaps a year or even two years earlier, although it was not until late in May 1929 that the writer at last succeeded in securing a personal record from each one of the 88 counties. During 1925 approximately 6000 individuals of the species were observed on all field trips, the majority being recorded during July and August as in the previous year.

After 1925 an attempt was made to actually count all smaller groups and take careful estimates of the larger flocks of starlings observed on each field trip and to tabulate these statistics for each month and year. In 1926, about 4500 birds were observed during the months of July and August and 2300 during the other 10 months of the year on 105 field trips.

In 1927, 157 days were spent in the field and 8490 individuals were recorded in 10 months, July and August being spent outside of Ohio. In 1928, 21,200 birds were checked in my roll book on 163 field trips. In 1929, 25,300 were recorded in 141 days. During these two years every Ohio county was visited. In 1930, 169 days were spent in the field, including some work in each one of the 88 counties of the state, and the starlings recorded totaled 25,400. In 1931, 21,689 starlings were recorded on 157 trips.

These figures and data would seem to indicate that the species occurred in Ohio in a number of localities previous to 1920, first occurrences usually being during the winter months, the greater numbers occurring during spring and fall movements or in July and August. From 1920 to 1923 starlings became frequent and well established as summer residents in many localities, occurring in widely scattered portions of the state. From 1924 to 1928, the species extended its range to every section, becoming common to abundant as a summer resident where suitable nesting sites were abundant. From 1928 to 1932, the numbers appear to have remained practically constant but with marked increases in some localities, and with an apparent general adjustment of the species to varying environmental conditions throughout the state. Starlings appear to have approximately reached their maximum abundance in most sections at the present time, under existing conditions.

The summary table given below of the number of starlings observed each year by parties in widely separated portions of the state in taking the annual 'Bird-Lore' Christmas Census, indicates the rapid increase in numbers of the species as a winter resident. The unusually large numbers recorded for the 1931 census are largely due to the very mild weather of the season and to the fact that several stations reported very large flocks, rather than to any considerable actual increase over the 1930 numbers.

Year	*Number of Census Reports*	*Number Reporting Starlings*	*Total Number of Starlings*	*Average Number of Starlings per census*
1920	14	1	25	—
1921	13	0	0	—
1922	17	1	14	—
1923	11	2	61	—
1924	12	4	56	5
1925	15	5	177	12
1927	18	12	455	25
1928	19	12	1218	64
1929	18	13	2557	141
1930	27	21	2174	81
1931	21	19	8570	408
1932	11	11	2618	238

Many problems remain to be solved concerning these new additions to our avifauna. Some of them that might be suggested are—

1. Where do our resident birds winter and where do our wintering birds breed?
2. When and how rapidly do the most important movements take place?
3. How extensive are the present migrations and wanderings of the species and what routes are followed?
4. Do flocks of birds remain constant as to individuals and number and do they use any one roosting site for any considerable length of time or from year to year?
5. Where do young starlings raised in Ohio breed the next year?
6. Are extensions of the present starling range made by the older birds or by the surplus offspring of each year?

Each problem mentioned brings to mind a number of questions which we must answer before we can really understand the status of this emigrant in its adopted land. The practical method which promises most, perhaps, is bird banding. From 1927–1932, the combined efforts of various members of the Wheaton Club of Columbus have made it possible to band approximately 15,400 starlings. Already sufficient returns have been received to enable us to predict what the answers to many of these problems probably will be. Many more returns are necessary. A number of banding stations have become interested in trapping starlings. A total of 100,000 starlings banded at widely separated stations in eastern United States would, perhaps, yield sufficient data to solve most of our present problems concerning the species—and quite likely suggest as many more new ones. The goal is one which could readily be reached if a number of banders became interested.

To answer some of the questions presented, it will be necessary to band nestling starlings in considerable numbers. The writer has attempted to band as many young birds as possible during the past four breeding seasons. As yet the number is meagre and the returns disappointing, but continued activity in this direction by interested bird banders should in time be rewarded by some valuable returns.

Dept. of Botany, Ohio State University,
Columbus, Ohio.

NOTES ON SOME BIRDS FROM SANTA CATHARINA, BRAZIL.

BY THE LATE C. ELIOT UNDERDOWN.

IN a collection of some five hundred skins received recently by Field Museum of Natural History, Chicago, from southern Brazil there are thirteen species which seem worthy of record as constituting notable extensions of range. All were collected by Edwin Steiger at, or in the immediate vicinity of, the city of Joinville, in the northeastern corner of the State of Santa Catharina. Identifications have been controlled by Dr. C. E. Hellmayr, who, besides, very kindly compared the *Troglodytes musculus bonariae* with the type and other pertinent material in European collections.

Accipiter superciliosus superciliosus (LINNAEUS).—An adult male collected July 2 is the first published record of this species from south of São Paulo.

Ixobrychus exilis erythromelas (VIEILLOT).—An adult male taken March 18. Hitherto unrecorded south of São Paulo.

Chloroceryle aenea aenea (PALLAS).—This minute kingfisher, represented by an adult male (July 19) constitutes another addition to Santa Catharina.

Herpsilochmus rufomarginatus rufomarginatus (TEMMINCK).—This example, an adult male (August 4), affords still another extension of range from São Paulo.

Cichlocolaptes leucophrys (JARDINE and SELBY).—An extremely rare species in collections, this woodhewer is here represented by an adult male (May 24). It is the first occurrence south of Rio de Janeiro and São Paulo.

Xenops minutus minutus (SPARRMAN).—An adult male (June 16) extends the known range of this bird from São Paulo to Santa Catharina.

Philydor atricapillus (WIED).—One male and two females (August 4, May 24, and July 14) add another species to the state. Its occurrence in Santa Catharina was, however, to be expected, M. Sztolcman having recorded it from the neighboring districts of Paraná.

Philydor lichtensteini (CABANIS and HEINE).—Two females (May 23, June 12) extend the range of this bird from Paraná to Santa Catharina.

Leptotriccus sylviolus CABANIS and HEINE.—The taking of an adult female (May 18) is of particular interest, a few specimens only from Rio de Janeiro and Paraguay (Puerto Bertoni) having previously been recorded of this excessively rare species.

Xanthomyias virescens virescens (TEMMINCK).—As this species is known from Paraná, the capture of an adult male (June 12) was rather to be expected.

Manacus manacus gutturosus (DESMAREST).—Three males and one female (June 18–July 16) constitute the first record from Santa Catharina, although the bird had been found in southern Paraná.

Thryophilus longirostris longirostris (VIEILLOT).—The taking of an adult male (August 6) adds this wren to the Joinville list, the species having been known to range from Rio de Janeiro to São Paulo.

Troglodytes musculus bonariae HELLMAYR.—Two adult females taken June 28, 1930, are typical of this race, agreeing with specimens from Buenos Aires in deep sooty brown upper parts with barely a slight rufescent tinge on the rump, brownish wings, very dull rufescent tail bands, and pale isabella color ventral surface. While its breeding so far north has yet to be proved, it should be mentioned that one of the specimens is just completing its annual molt.

THE DOVEKIE INFLUX OF 1932.

BY ROBERT CUSHMAN MURPHY AND WILLIAM VOGT.

INTRODUCTION.

THE Dovekie or Little Auk, *Alle alle* (Linnaeus), is a sea bird of the Atlantic segment of the North Polar and Temperate regions, the breeding range of which extends eastward from Ellesmere Island to the Arctic archipelagoes north of Europe, or throughout about one-third of the earth's circumference in high northern latitudes. During the winter the species migrates in flocks southward in the Atlantic, to the latitudes of the Virginia Capes on the American side, and normally somewhat farther, or across latitude 30° N., on the eastern side of the ocean. It is distinctly an offshore, rather than a littoral species, and is at times abundant even in mid-ocean.

Each winter numbers of Dovekies are stranded along parts of the Atlantic coast of North America, the phenomenon being normal and regular from eastern New England northward, and casual farther southward. At intervals, the birds travel inland in so-called "flights," of which the most notable in the records seems to be that which took place in Massachusetts in the middle of November, 1891 (Brewster, William, 1906, Mem. Nuttall Ornith. Club, No. IV, p. 90). Similar accounts exist of invasions in western Europe (Haverschmidt, Fr., 1930, Ardea, Vol. XIX, p. 63).

During November and December of 1932, an influx of Dovekies, on a scale apparently unprecedented within the historic period, took place along the coast of North America, from the Canadian provinces to Florida and Cuba. In response to a request by the Editor of 'The Auk', published in the January, 1933 issue, there has been received at the American Museum of Natural History a mass of records and other observations, which we herewith present in summary. It is impracticable to name all of the several hundred contributors who have assisted in this inquiry, but to each of them we take this opportunity of expressing our own appreciation as well as that of 'The Auk' and its readers.

The following published accounts of the recent influx have already come to our attention:

Bailey, H. H., 1932. The Dovekie in Florida. The Oölogist, Vol. XLIX, No. 12, pp. 140, 141.

Crandall, L. S., 1932. The Dovekie Invasion. Bull. N. Y. Zoöl. Soc., Vol. XXXV, No. 6, pp. 207–213, 4 figs.

Longstreet, R. J., 1933. Dovekies in Florida. Florida Naturalist, Vol. VI, No. 2, pp. 38, 39.

Lunt, Helene, 1933. Dovekies in the Bronx. Journ. N. Y. Botanical Garden, Vol. XXXIV, No. 397, pp. 5–9, 1 fig.

May, J. B., 1933. More about Dovekies. Bull. Mass. Audubon Soc., Vol. XVI, No. 9, p. 15.

Packard, Winthrop, 1932. It Rained Dovekies! Bull. Mass. Audubon Soc., Vol. XVI, No. 8, pp. 3–5.

THE RECORDS.

The following tabulated data were in most cases substantiated by birds, dead or alive. A small proportion is based upon sight records but the chances of error, under the circumstances, are almost negligible. Because certain information was sent in second-hand by interested persons, the actual provenance of a particular specimen may not in every case be indicated by the accompanying place name. The discrepancy in such instances, however, would seldom amount to more than the distance between one village and the next, or a matter of a mile or two. Dates have been included whenever certainly known. They all fall within the months of November and December, 1932.

Quebec.

Cowansville, Missisquoi Co., Dec. 12, 1 alive (V. C. Wynne-Edwards).
Rivière Ouelle, Kamouraska Co., 1; Ste-Anne de la Pocatière, 2 (Father Tanguay and Dr. D. A. Dery).

Nova Scotia.

Tusket Islands and Yarmouth, many reported about Dec. 1; carcasses everywhere in last week of Dec. (R. A. Johnson).

Maine.

Kittery, Nov. 18, many on beach (J. P. Benson).

New Hampshire.

Portsmouth, Nov. 14, 2 dead in road (J. D. Smith).
Wolfboro, Nov. 7–10 (J. B. May).

Massachusetts.

Amherst, Nov. 19, 1 alive but disabled (A. C. Bagg).
Athol, Nov. 9 and 10, 1 alive (A. C. Bagg).
Boston, Nov. ?, about 10 alive and as many dead picked up in streets; several swimming in flooded gutters (R. T. Peterson); 1 in street, Nov. 20 (?) (F. W. Benson); several swimming in Jamaica Pond (J. D. Smith).
Boylston Township, Nov. 15, 1 dead (G. E. Keogh).
Cape Cod, Nov. 10, about 28 near North Eastham; Nov. 11, 150 swimming along the Bay side of the Cape; total of 56 on land (O. L. Austin, Jr.).
Concord, Nov. 20, 1 (Miss E. Alexander).
Dedham, Nov. 11, 1 (F. V. Crane).
East Walpole, Nov. ?, 1 in Vose's Pond (F. V. Crane).
Flax Pond, Nov. 11, 1 (A. P. Morse).
Holyoke, Nov. 19, 20, "a dozen"; 1 swimming in Ashley Ponds Reservoir, Nov. 20 (A. C. Bagg).
Huntington, Nov. 19, 2 (A. A. Cross).
Islington, Nov. 5, 11 near the railroad tracks (F. V. Crane).
Martha's Vineyard, Nov. 12, numbers alive on Squibnocket Pond (Francis Marsh); still alive at the same place, Nov. 20 (Lindsey Austin).
Mystic Lakes, Nov. 11 to at least Nov. 27, several (J. B. May).
Norwood, Nov. 11, 6 or more alive on pond (Mrs. F. V. Crane).
Quincy, Nov. 25, numbers flying, some being apparently forced down into the river by the strength of the wind (William Avery).
Seekonk, Nov. 17, 2 in dooryard (Mrs. A. H. Walter).
Springfield, Nov. 19, several within the area (T. W. Burgess).
Walpole, Nov. ?, 2 in cranberry bog (F. V. Crane).
Wellesley, Nov. 11, 2 (A. P. Morse).
Westborough, Nov. 18, 1 dead in street (Robert Harrington).
Westfield, Nov. 19, 1 dying (A. C. Bagg).
Worcester, Nov. 10, 1 alive; Nov. 20, 1 swimming in park (H. C. Parker).

Rhode Island.

Block Island, Nov. ?, "It fairly rained Dovekies" (Miss Elizabeth Dickens).
East Greenwich, Nov. 20, 1 in Potowomut River (Mrs. A. H. Walter).
Gloucester (14 miles from coast), Nov. ?, 1 (Mrs. H. P. Salisbury).
Johnston, Nov. 17, 3 swimming in a brook, 2 on land (Mrs. A. H. Walter).
North Smithfield, Nov. 17, 1 alive in road (Mrs. A. H. Walter).
Peace Dale, Nov. 20, 1 (Mrs. A. H. Walter).
Point Judith neighborhood, Nov. ?, 6 in ponds and on the shore; several escaped again to the salt water (Mrs. A. H. Walter); many washed ashore near the Point (Mrs. H. P. Salisbury).
Providence, Nov. 17, 1 alive in Roger Williams Park Lake; Nov. 20, 3 in the city streets; many brought to Angell and Cash, taxidermists, within a few days of these dates (Mrs. A. H. Walter).

Usquepaugh, Nov. ?, 1 in Queen's River (Mrs. A. H. Walter).
Watchaug Pond, Nov. 22, a number swimming (Mrs. A. H. Walter).
Weekapaug, Nov. 20, 1 (Mrs. A. H. Walter).
Wickford, Nov. 17, 2 (Mrs. A. H. Walter).

Connecticut.

Branford, Nov. 19, 1 (T. A. James).
Bristol, Nov. 22, 1 on street car track (H. C. Downs).
Clinton, Nov. 20, 1 (G. G. Goodwin).
Darien, Nov. 19, 1 (specimen to American Museum).
Guilford, Nov. 19, 2 (T. A. James).
Hadlyme, Nov. ?, "a flight" (A. W. Brockway).
Hamden, Nov. 19, 1 (T. A. James).
Lyme, Nov. 19, 2 (T. A. James).
Meriden, Nov. 19 or 20, 1 (M. E. North).
New Haven, Nov. 19, 1 (T. A. James).
New London, Nov. 19, 2 (T. A. James).
Old Lyme, Nov. 19, 1 (G. H. Macauley).
Simsbury, Nov. 19, 1 (T. A. James).
Terryville, Nov. ?, 1 (Frank Bruen).

New York.

1. (Long Island).

Alley Pond Park, Nov. 26, 1 dead (Arthur Rorden).
Baldwin, Nov. 19, several reported (William Vogt).
Bayside, Nov. 23, 1 alive (Charles Easton).
Bellmore, Nov. 20, 2 (Captain Stevens).
Biltmore Shores, Nov. 19, 3 swimming in canal (F. F. Reichner).
Bridgehampton, Nov. 24, 7 dead on beach, 1 inland (H. B. Squires).
Brookhaven, Nov. 20, 1 on pond (LeRoy Wilcox).
Brooklyn, Nov. 20, 1 (specimen to American Museum); 1 in street, released in South Oyster Bay (John Roach); Nov. 26, 1 dead in Prospect Park (Allan Cruikshank).
Cholera Banks (12 miles off Long Beach), Dec. 1, 1 (H. C. Armin).
Cold Spring Harbor, Nov. 19 or 20 (specimen to American Museum).
East Moriches, Nov. 22, 1 among duck decoys in Moriches Bay (LeRoy Wilcox).
Eastport, Nov. 19, several (LeRoy Wilcox).
Far Rockaway, Nov. 19, 1 (specimen to American Museum).
Greenport, Nov. 19, 1 (C. L. Fournier).
Hempstead, Nov. 20, 3 (Kenneth Van de Water); Nov. 29, 1 carcass in the reservoir (Arthur McBride).
Hempstead Bay, Nov. 19, "thousands" reported by baymen.
Huntington, Nov. 19, many reported in Sound; several shot by gunners (Mrs. H. S. Hunt).
Islip, Nov. 19, 7 (William Vogt).

Jamaica Bay, Nov. 19, "thousands" (William Merritt); Nov. 27, 1 (William Vogt).

Jones Beach, Nov. 17, 1 freshly dead on Ocean Boulevard; Nov. 19, 6 captured and banded, 1 swimming on bird sanctuary pond, a flock of 40 flying west, others over meadows; a total of a hundred or more (William Vogt); 75–100 east of causeway (Frank Roach).

Lloyd's Harbor, Nov. 20, 1 swimming (Mrs. H. S. Hunt).

Long Beach, Nov. 20, 1 flying westward (Dr. E. R. P. Janvrin); Nov. 27, 2 (Allan Cruikshank).

Manorville, Nov. 19, 1 (LeRoy Wilcox).

Mastic, Nov. 22, 5 on the ocean beach (LeRoy Wilcox).

Miller Place, Nov. ?, 1 alive near railroad (Nathaniel Tuthill); Nov. 22, 2 alive on Sound Beach (G. P. Helme).

Moriches, Nov. 19 and 20, several (Donald McKellar).

Moriches Bay (near Swan Island), Nov. 19, many small flocks (LeRoy Wilcox).

Moriches New Inlet to Shinnecock Bay, Nov. 19, about 3000 between 11 A. M. and 4 P. M. (LeRoy Wilcox).

Oakdale, Nov. 19, about 150 dead in woods, and from two to three thousand on the ponds of the South Side Sportsmen's Club (A. G. Allen).

Pon Quogue, Nov. 19, "a great flight" (J. H. Hendrickson).

Riverhead, Nov. 19, a dozen or so (Harold Herrick).

Rockaway Point, Nov. 24, 1 took flight from smooth water; many others reported by coast guards (Mrs. G. G. Fry).

Shinnecock Bay, Nov. 19, many flying eastward (LeRoy Wilcox).

South Oyster Bay, Nov. 19, generally distributed and in great numbers (Game Protector Weinberger).

Speonk, Nov. 19, "bay black with them close to shore" (LeRoy Wilcox).

Wading River, Nov. ?, 1 (local newspaper report).

Wantagh, Nov. 20, 1 (William Vogt).

Westbury, Nov. 19, 1 in the Hicks' Nursery, banded and released at Jones Beach (John Matuszewski).

Westhampton, Nov. 19, many (LeRoy Wilcox).

Woodhaven, Nov. 19, 1 (specimen to American Museum).

2. (Staten Island).

Great Kills, Nov. 18–25, several continuously on a small salt pond (M. C. Rich); Nov. 19, 1 dead (F. Hansa).

Staten Island (districts not designated), Nov. 19 and 20, 5 (specimens to American Museum).

Waterside Park, Nov. 23, 2 on Wolcott Pond (Mrs. G. G. Fry).

3. (Manhattan and the mainland).

Ardsley, Nov. 20, 1 in garden (C. E. Lichtenauer).

Borough of the Bronx, Nov. 19 and 20, 6 (specimens to American Museum); Nov. 21, 1 (Helene Lunt).

Brewster, Nov. 19 or 20, 1 (specimen to American Museum).
Chappaqua, Nov. 19 or 20, 1 in brook (specimen to American Museum); Nov. 20, 1 in brook (Robert Burnap).
Harrison, Nov. 20, 1 two miles from Sound (Frederic Atherton).
Hopewell, Dec. 4, 1 dead near Fishkill Creek (T. R. Pell).
Hudson River Parkway, Nov. 19, 1 (T. A. James).
Millbrook, Nov. 20, 1 alive (Howard Dunn).
Monroe, Nov. 20, 1 caught by cat (William Simpson).
New York Botanical Garden, Nov. 20, several (Helene Lunt).
Peekskill, Nov. ?, 1 (L. S. Crandall).
Scarsdale, Nov. 19 or 20, 2 (specimens to American Museum).
Spuyten Duyvil Creek, Nov. 20, 5 captured, cooked, and eaten by boys (G. T. Hastings).

New Jersey.

Andover, Nov. 19, 1 alive in field (W. K. Longcor).
Atlantic Highlands, Nov. 19, 1 on beach (Dr. A. A. Brill); 2 (C. A. Urner).
Barnegat Bay (20 miles north of Atlantic City), Nov. 19, 4 captured (R. H. Swarthwout).
Barnegat Dock, Nov. 19, 12 flying, others on water (M. S. Ley).
Barnegat Light, Nov., 200 or more about for ten days (W. A. Rothas).
Belleville, Nov. 19, 1 alive (W. H. Patten).
Belmar, Nov. 20, 31 within twenty minutes (C. A. Urner).
Bernardsville, Nov. 19, several (Mrs. Theodore Herbst).
Beverly, Nov. 19 to 21, a flock of 50 or more swimming and diving in the Delaware River (Allan Baird).
Bloomfield, Nov. 19, 1 (B. S. Bowdish).
Cape May, Nov. 20, 1 alive (John Mecray); Nov. 21, 1, which escaped, in the main street (Witmer Stone); Nov. 24, several dead and 2 swimming in harbor (O. H. Brown and C. C. Page); Nov. 25, others, dead and alive, seen by the same and other observers.
Chatsworth, Nov. ?, 4 alive in the Pine Barrens (Joseph Evans).
Chester, Nov. 19, several brought to a taxidermist (Mrs. Augustus Dalrymple).
Cranford, Nov. 19, 2 (C. A. Urner).
Dover, Nov. 19, 1 in road (Mrs. Augustus Dalrymple.)
Elizabeth, Nov. ?, 3 in Newark Bay (C. A. Urner).
Forked River, Nov. 19, gunners reported upwards of a hundred near mouth of river (C. A. Urner).
Freehold, Nov. 19, 1 (C. A. Urner).
Glen Ridge, Nov. 19, 1 (B. S. Bowdish).
Hackensack, Nov. 19, 1 (B. S. Bowdish).
Haddonfield, Nov. 22, 1 dead (J. W. Tatum).
Jersey City, Nov. 19, 1 (specimen to American Museum); 1 in Hudson River (C. A. Urner).
Lavalette, Nov. 20, 2 dead (C. A. Urner).

Leonardo, Nov. 19, several (Mr. Teeple).
Long Branch, Nov. 19, 1 (Mrs. L. G. Swanson).
Long Valley, Nov. 20, 3 alive (M. A. Collins).
Lovelady's Island, Nov. ?, flocks of more than a hundred each (J. W. Tatum).
Lyndhurst, Nov. 20, 1 alive in road (R. J. Fiaccavento).
Manasquan Inlet, Nov. 19, many flying south (C. A. Urner).
Milmay, Nov. 26, 1 in Pine Barrens (O. H. Brown).
Montclair, Nov. 19, several (C. A. Urner).
Newark, Nov. 19, 1 (A. W. Howland); several (C. A. Urner).
New Milford, Nov. 19, 1 (B. S. Bowdish).
Northfield, Nov. ?, 1 on meadows (A. E. O'Neil).
North Wildwood, Nov. 21, 1 (O. H. Brown).
Perth Amboy, Nov. 19, 2 (C. A. Urner).
Pine-Barrens, about 10 miles from coast, Nov. 19, 1 (C. A. Urner).
Plainfield, Nov. 19, 2 (C. A. Urner); Nov. 20, 1 (W. F. Eaton).
Point Pleasant, Nov. 19, 1 (C. A. Urner).
Preakness, Nov. ?, 1 (observer unrecorded).
Ramsay, Nov. 20, 1 (C. R. Ferguson).
River Edge, Nov. 19, 1 which had been banded on the same day at New Milford, one mile distant (B. S. Bowdish).
Sandy Hook, Nov. 24, 1 alive, 1 dead (Mrs. L. G. Swanson).
Sandy Hook to Belmar, Nov. 27, a number along beach (C. A. Urner).
Sea Isle City, Nov. 19, present all over the meadows; several swimming in every salt pool (E. W. Richman and others).
Seaside Park, Nov. 19, 2 (C. A. Urner).
Shark River Inlet, Nov. 19, 33 (C. A. Urner).
South Orange, Nov. 19 and 20, 2 (specimens to American Museum).
Springfield, Nov. 19, 1 (C. A. Urner).
Surf City, Nov. 27, 1 dead in road (J. W. Tatum).
Tenafly, Nov. 19, 2 alive (Arthur Mason and F. S. Granden).
Westwood, Nov. ?, 1 (E. S. Van Nostrand).

Pennsylvania.

Bristol, Nov. ?, 1 (Harry Pittman); Nov. 19, 2 alive (Howard Asay).
Langhorne, Nov. ?, 1 (Witmer Stone).
Newton, Nov. ?, 2 (Ralph Ratcliffe).
Norristown, Nov. 19, 1 in center of town (R. J. Middleton).
Oxford Valley, Bucks Co., late Nov.–early Dec., 3, of which 2 were seen on a small stream for about a week (Edward Cocks).
Philadelphia, Nov. 19 and 20, 4 alive in various parts of the city (Witmer Stone).
Pottstown, Nov. ?, 1 alive on house porch (M. A. Drabinsky).
Schwenksville, Nov. 19, 1 alive in Perkiomen Creek (Hastings Zugler).

Delaware.

Milford, Nov. 28, 1 (Herbert Buckalew).

Maryland.

Nov. ?, 1 reported (E. T. Gilliard).

Virginia.

Back Bay, Nov. 28, 1 near the North Carolina line (J. W. Mittendorf).
Chincoteague, Nov. ?, 5 (Herbert Buckalew).

North Carolina.

Cape Lookout, Nov. ?, 2 (Dr. B. F. Royal).
Lookout Bay, Dec. 13, 1 (J. S. Gutsell).
Off New River Inlet, Dec. ?, large numbers of unfamiliar "very small black and white ducks" reported by fishermen (T. G. Samworth).
Poplar Branch, Nov. 28, Dovekies numerous on ponds of Narrows Island Club (G. de F. Lord); Dec. 2, 1 (H. H. Brimley).
Wrightsville Beach, Dec. 14, 1 dead (R. E. Calder).

South Carolina.

Big Bay Island, Dec. 4, 1 (H. R. Sass, Jr.).
Folly Island (10 miles south of Charleston), Dec. 2, 1 (Mrs. Beverly Mikell); Dec. 5, 1 (C. C. West).
Pawley's Island (near Georgetown), Dec. 4, 1 (Alexander Sprunt).

Georgia.

Lightship 94, off Tybee Beach, late November, "thousands" flying southward; 3 specimens to Charleston Museum (Alexander Sprunt).

Florida.

Biscayne Bay, Dec. 1, many on the bay (F. M. Chapman); Dec. 4, a few dead birds (James Silver and Carlyle Carr).
Brevard Reserve (Pelican Island), Nov. 30, "fifty flying, one swimming, many dead"; by Dec. 2 the water was "full of them" (W. E. Shannon).
Daytona Beach, Nov. 30, 15 living, 15 dead, along ten miles of beach; more than fifty reported (R. J. Longstreet); Dec. ?, "beach covered by Dovekies" (W. W. Cheney); large numbers in the streets and yards (H. I. Middleton).
Fort Pierce, Dec. 2, 12 on the beach (Mrs. D. B. Upton).
Jacksonville, about Dec. 1, reported (H. H. Bailey).
Jupiter, Dec. 1, "thousands from Jupiter southward" (H. H. Bailey).
Key Largo, about Dec. 1, reported (H. H. Bailey).
Lake Worth beach, Dec. 2, 30 dead (H. H. Bailey).
Long Key (about 100 miles south of Miami), Dec. ?, 1 (F. M. Chapman).
Loxahatchee River (20 miles north of Palm Beach), Dec. 1, 1 swimming (Mrs. D. B. Upton).
Matecumbe Key (80 miles south of Miami), Dec. 3, 9 (James Silver and Carlyle Carr).
Merritt's Island, about Dec. 1, (H. H. Bailey).

Miami, Nov. 30, several on beach (F. M. Chapman); 50 live birds in shrimp pools at the Causeway (Jerry Minas).

Palm Beach, Nov. 29, several in surf and ashore; Dec. 1, 37 dead or dying, several hundred in the water or flying south (James Silver and Carlyle Carr); Dec. 2, 52 dead birds picked up (Oscar Swed); the 'Palm Beach Post' reports, "for the last day or so Dovekies have been caught in large numbers."

St. Augustine, Nov. 28–Dec. 2, Dovekies dying "by hundreds" in the vicinity (T. Van Hyning).

Cuba.

Matanzas Bay, "two or three days after the cyclone of November 9, 1932, which destroyed the town of Santa Cruz del Sur," 6 caught in cast-nets by fishermen, and brought alive to Professor Cleto Sánchez, of the Colegio "La Luz." All died within 24 hours, refusing food. Others were seen by the fishermen, but a day later none was to be found (S. C. Bruner).[1]

Santa Maria del Rosario (20 kilometers from Havana), Dec. 1, 1 alive in a stream; Dec. 6, 1 dead near the same place (J. H. Bauzá).

THE FLIGHTS AND THE WEATHER.

In the northerly part of the Atlantic coastal region the inland flights of the Dovekies seem to have been immediately due to high winds from the sea. New England observers refer to a boisterous northeasterly storm, from November 7 to 10, that terminated in a heavy downpour of rain. During and after this gale the first Dovekies were reported from inland localities of New Hampshire and Massachusetts, two or three of them as far west as the Connecticut Valley. One was found in Warwick, Mass., and a second at Athol in a freight car that had just come in from the west! Professor Samuel A. Eliot, Jr., of Smith College, writes that both these birds were released in the Connecticut River, in which they disappeared down stream. The vast majority of Dovekies reported after this storm were, however, in eastern Massachusetts.

It remained for a second severe storm, raging on November 19 and 20, and coming mainly from a southeasterly quarter, to drive a larger number of Dovekies overland into the Connecticut Valley.

[1] This is the only one of the multitudinous records that does not appear to fit the probable period. A December date would seem more likely. The single Matanzas skin seen by Dr. Bruner bore no label, and the letter of information from Professor Sánchez was written on April 13, 1933. The Editor of 'The Auk' has written for confirmation or emendation of the date of capture which, it is hoped, may be published later.

To Professor Eliot, Mr. Aaron C. Bagg, and others, we are indebted for records from Springfield, Holyoke, Northampton, Huntington, Amherst and Westfield, Mass. The same storm likewise scattered others broadcast over large areas of Rhode Island, Connecticut, Long Island, New Jersey, and "practically every county of southeastern Pennsylvania." The last statement is made upon the authority of Mr. Thomas E. Winecoff, of the Pennsylvania Board of Game Commissioners.

Specific data on these two storms, from Weather Bureau reports, are as follows. The first was characterized by northerly and northeasterly gales along the northern Atlantic coast on November 8 to 10, the wind reaching a maximum velocity of 50 miles per hour at Block Island on November 10. The weather subsided on the following day and there were no further coastal winds of high force until November 18, when a meteorological low over the coastal region from Ontario to Virginia determined the prevalence of winds from the sea. On November 19, along the south shore of Long Island, the wind had a velocity of 30 miles per hour from the southeast at seven o'clock in the morning. This increased gustily to a maximum of 51 miles per hour shortly after noon, and then fell off gradually until mid-afternoon, at the same time swinging through south toward west. Intermittent rain, frequently falling in heavy bursts, continued until about four o'clock. (Those who attended football games in the Yale Bowl or elsewhere in the east will need no further reminder of either wind or rainfall.) Late afternoon was calm. Shortly before sunset, a light breeze shifted by way of west toward the northwest, from which direction it came, with clear, crisp weather, on the morning of November 20.

Dr. Oliver L. Austin, Jr., of the Austin Ornithological Research Station at North Eastham, Cape Cod, describes the Dovekie invasion of the first November storm. He writes:

> The northeasterly gale commenced on Monday, November 7th and continued until Thursday, November 10th. The wind blew with almost hurricane force from Monday until Thursday evening, when it began to abate, and Friday was calm and clear. Dovekies started to come ashore either late Wednesday night or early Thursday morning. Most of them landed just inshore of the dunes on the ocean side of the Cape. On Thursday afternoon we picked up 16 in a two-mile stretch north of Nauset Light, and in the same area the coast guard patrol had given about a dozen a

helping hand onward. At that time the birds were all fat and in good condition. We banded all we found and tossed them into the air over the dunes, all of them at once flying off into the swelter. Some had dropped inland at various points in the streets and yards. On Friday morning I encountered 150 on the Bay side of the Cape, swimming close inshore along the beach. The telephone rang all day Friday as people called up to report the birds, and 22 were brought to the Station by our interested neighbors. By Friday afternoon the birds brought in were either dead or so thin and weak that they could not fly.

From what I saw, I should say that the Dovekies came ashore here by hundreds rather than thousands, and from evidence in the Boston newspapers I judge that the flight was heavier here than elsewhere in Massachusetts. We were able to band a total of 23 healthy birds which flew off in apparently good condition.

Turning now to Long Island, and the storm of November 19, we find that large numbers of Dovekies were reported by many observers along the greater part of the south or ocean shore. Writing from Pon Quogue, Hampton Bays, Mr. John H. Hendrickson states that flocks of from 25 to 300 were reported by gunners, and that many birds fell exhausted on beaches, meadows, fields, and roads throughout the Hamptons, or were killed by striking houses, poles, and wires. From the western end of the Island, Mr. Harry C. Armin tells of the constant passing of small flocks of Dovekies along the coast between Fort Tilden and Point Lookout. The birds seen were mostly over the breaking waves, though some passed above the sands of Jacob Riis Park. Groups on the ocean disappeared and reappeared very rapidly, as the birds settled in the rough water and took off again. At Jones Beach, near the central part of the south shore, many small flocks were seen by one or both authors of this paper over the land and the ocean. The peak of the flight seems to have been attained here shortly before noon. Groups of birds over the back-beach and meadows would at times fly very close to the ground, only to turn sharply upward without alighting. We suspect that they mistook the wet concrete parking spaces of the Jones Beach State Park for patches of water, at least until they skimmed the surface of such places. Single Dovekies flying above the ocean beach are reported sometimes to have stopped in air and hovered for a few moments above the heads of human beings, as if moved by curiosity.

Several of the Long Island accounts for November 19 and 20 tell

of definite directional movements, the birds all flying east or all flying west. Since there seems to be no consistency in this testimony, however, the reports doubtless refer to chance "follow the leader" flights of bewildered birds along shore.

On Sunday, November 20, the gathering of spoils went ahead throughout the countryside, and on Monday morning the department of birds at the American Museum of Natural History began to be deluged with inquiries. About thirty specimens from three states were also received during the day. By Tuesday, the 22nd, nothing more was heard of live birds away from the sea, except for a few that elected to remain in coves and ponds where they evidently found food. The great ocean flight also passed southward or off to sea very quickly, although now and then a free and active Dovekie was reported in the waters off Long Island up to December 12. Only normal numbers, meaning very few, appeared in the Christmas census of 'Bird-Lore.'

For the compilation of the tabulated records and other data from New Jersey, we are greatly indebted to Mr. Beecher S. Bowdish who not only handled many Dovekies himself but also, through his post as Secretary of the New Jersey Audubon Society, received records from all parts of the State.

Mr. Charles A. Urner, of Elizabeth, N. J., writes that the first New Jersey birds were driven ashore during the night of Nov. 17-18. On the morning of the 18th, flocks were observed in the heavy rain in Barnegat Bay. More of them had come in by the following day, and groups were to be seen scattered about the area until at least the end of November.

Mr. Alexander Sprunt, Jr., of Charleston, sends the following data regarding the migration of the birds along the South Carolina and Georgia coasts:

> The first intimation of the occurrence of Dovekies in South Carolina was the finding of a dead bird on the beach of Folly Island, about ten miles south of Charleston, on Dec. 2d. It was greatly emaciated, as were others found later near the same place and at Big Bay and Pawley's Islands.
>
> Captain T. Danielson, of Lightship 94, stationed off Tybee Beach, Georgia, brought three birds to the Charleston Museum in fluid, on Dec. 12th. He stated that "thousands" of them had passed his ship in late November, all flying southward. Some stopped about the ship and he succeeded in catching several with a dip-net from the deck. He made an

attempt to keep them alive in a tub of salt water, providing them with fish, but they all refused to eat.

Dr. Frank M. Chapman, writing from Miami, Florida, reports that the flight reached Biscayne Bay about December 1, on which date numbers of Dovekies were seen. Very many were picked up dead or dying and large numbers were received by Mr. Al Pflueger, taxidermist, in whose possession Dr. Chapman saw them. All the birds examined were emaciated and had apparently died from starvation and exhaustion. According to Mr. R. J. Longstreet, of Daytona Beach, Florida, a heavy northeasterly storm had lashed the coast from November 27 to 29, and on the latter date he saw the first Dovekies in the surf. The Palm Beach News of February 2, 1933, published a photograph of ten mounted Dovekies, said to represent a few of "hundreds" picked up along the beach by Mr. J. E. Wallace during early December. At noon of December 3, Dr. Chapman saw a single bird flying southward at Miami. He writes: "It is probable that the momentum of the flight and lack of objective carried many birds still farther south." This is abundantly confirmed by other observers, and Messrs, James Silver and Carlyle Carr, of the United States Biological Survey, call particular attention to the fact that the southward flight continued long after the cessation of the storms credited with initiating it. By December 1, the vanguard had reached Cuba, for on this date a record for that island was established by a living bird in a small stream at Santa Maria del Rosario, as reported by Sr. José Hernandez Bauzá to Dr. Thomas Barbour of Cambridge and Dr. Herbert Friedmann of Washington.

The report of Mr. LeRoy Wilcox of the flight on Long Island, New York is so graphic that it is presented in full:

We arrived at Swan Island, Moriches Bay about 11 A. M. November 19, and I began to realize that the wind was beginning to blow up rather briskly. Then it was that I had my first sight of the Dovekies. I chanced to look out over the bay and saw a flock of ten birds flying west. At first sight they appeared to be small ducks and for their size were flying very fast. But after a good look at them I realized they were not ducks, but as they were at quite some distance away and I had no glasses with me, I was unable to place them. Then I noticed a large sedan stop in the beach road near the Coast Guard Station while the driver looked at some object ahead of him in the road. Then I saw a small bird fly up from the road, alight again and then go over the beach hills out into the ocean. I knew

that it was a Dovekie so I ran as fast as possible over to the ocean and saw several flying out over the surf. I resolved to go home at once to get my glasses and gun to collect a couple of the birds. Little did I realize then that I would have no need for a gun to collect them.

Accordingly I drove home some eight miles as fast as possible. I had no sooner arrived there than my brother-in-law informed me that there were two Dovekies swimming in a creek only a short distance away on the mainland and nearly two miles in a straight line from the ocean. I immediately drove there and found them only about fifty feet from the road. I then drove down to the bay and saw four others close in shore. These as well as all others seen on the water were not once seen to dive but were simply floating on the water with head and neck drawn in close to the body apparently riding out the storm and waiting for it to subside. I then realized that an unusual invasion of these birds was going on.

I immediately decided to drive back over to the beach without spending any more time searching around the bay as I would have an opportunity to observe the birds from the ocean side as well as the bay side of the beach.

I had no sooner crossed the bridge at Westhampton and come on to the beach road than I saw a Dovekie alight in the grass near the road. I stopped the car and soon had the bird which had a good part of the breast feathers soaked with oil. I drove west to the end of the beach road near the Moriches Coast Guard Station and saw that the birds were becoming more numerous as time went on. It was now about 1 P. M. and a heavy downpour kept me inside of the car for a few minutes. After the rain slacked up I decided to walk the one-half mile west to the Moriches Inlet. Water from the ocean was running over the beach road to a depth of several inches. I soon found one Dovekie nearly dead that had just been washed up in the surf. It was covered with foam but had no oil on it. It died within a minute or so. Two were seen flying east over the beach right in a flock of fifteen Sanderlings. At the inlet I found two dead, apparently not fresh but from the storm of the week before.

Dovekies were now flying all over the ocean, over the beach hills, meadows and out over the bay. Because of another heavy downpour I had to run for shelter under a small overturned building that was washed out by the storm of the week before. While crouching here I saw one Dovekie flying with the wind at great speed hit the telephone wires and go hurtling down to the ground. The rain soon slacked so I went and picked up this bird. It was still alive but soon died as it had a big gash in its neck where the wire had cut it.

It was now about 2 P. M. and up to this hour they had been flying in all directions. But after 2 P. M. at what seemed to be some mysterious command they all began to move east and I did not see a single bird flying west after that hour.

I decided to drive to Shinnecock Bay to observe conditions there. On the way I stopped about a mile east of the Moriches Coast Guard Station and walked over to the ocean beach. Birds were now in sight continually

and they ranged from singles up to flocks of thirty-five, with the average flock containing from fifteen to twenty birds. I did not observe many far out over the ocean, most of them flying over the breakers and many of them right over the beach. The latter did not keep on a straight course but kept continually moving out over the surf and back again over the beach. All of them were flying low, some just skimming along over the sand of the beach. As I stood by the surf some of the single birds would seem to stop and hover over my head for a few seconds. I could probably have knocked them down with a stick they came so close to me. They seemed to show no fear of man whatever and it appeared they paused out of curiosity.

On my way again to Shinnecock I saw one dead in the road with a crushed head which had been run over by a car. A short distance away was a live one sitting in the road. I walked up to it and it managed to rise up off of the ground and fly for about twenty-five feet. This extra exertion apparently tired it out again as I walked up to it and it made no further attempt to escape. A few hundred feet to the east I saw another one sitting near a hay stack by the side of the road. This bird made no attempt to escape and was easily caught.

I arrived at Shinnecock about 3 P. M. and found that all were still flying east. The wind was now blowing harder than at any time during the day. Nearly all of the Dovekies were now flying over the beach hills and only a few out over the surf. Even though the sand was wet it was carried with such force by the wind over the top of the beach hills that I could not face it. It cut my face and blinded me so that I sought shelter in a little hollow and watched the flocks fighting their way into the teeth of the gale. They were just skimming the beach hills and when they attempted to go over to the ocean the full force of the wind struck them and carried them almost straight up in the air and then back over the hills and even driving some out over the bay.

I stayed at Shinnecock for about thirty minutes and all this time stragglers were beginning to drop down out of the flocks into the grass on the hills. As soon as they alighted they hurried behind a clump of grass to try to secure shelter from the wind and sand. When approached none of them attempted to fly and seemed to show no fear of me. They would always alight in the hollows. All that I saw alighting were single birds except once when a pair came along and both alighted in the hollow next to me. Of course the visibility was poor but for the short distance that I could see on either side of me they were dropping into the grass at the rate of about one bird every three or four minutes.

It was now about 3.30 P. M. and there was another downpour so I had to hurry back to the car.

Returning to Westhampton I found one dead Dovekie in the road and two others on the sidewalk leading from the beach to the village. These last three were not injured in any way and simply died from exhaustion. I also caught another live one in the beach road near the Westhampton Coast Guard Station. While catching this last one a Coast Guardsman

from the Quogue Station told me they had caught a number of live ones in the streets of that village.

Altogether I would place the conservative estimate of Dovekies actually seen at about three thousand. By far the greater number were observed from 2 to 4 P. M. Besides about fifteen dead that I had picked up I had about a dozen live ones which I hoped to band and release as soon as the storm let up. But they all died from exhaustion in about twenty-four hours.

A duck hunter at Westhampton brought me five that he had shot not knowing what they were and said he could easily have shot a hundred of them. My brother-in-law said the bay at Speonk Shore was black with them close to shore late in the afternoon and that they were so tame he could almost catch them with his hands.

Some were driven inland to fresh water ponds, especially at Eastport where they were seen to dive repeatedly, apparently feeding. One was also seen in a fresh water pond at Brookhaven on the 20th which is about five miles from the ocean. One was found dead in a road at Manorville right in the center of Long Island.

On the next day, the 20th, the wind had changed to northwest. I found one live Dovekie hiding in the grass near the shore at Speonk and also saw a live one in a creek at Eastport about one mile from Moriches Bay. The afternoon of the 20th I spent in Great South Bay cruising off Bay Shore out almost to Fire Island Inlet but did not sight a single Dovekie.

On November 22 one alighted in some duck decoys in the bay at East Moriches and on the same day a duck hunter caught one live bird out of a bunch of five on the ocean beach opposite Mastic.

On December 2 my brother-in-law and I rigged out our duck decoys off Speonk Pt. in Moriches Bay at about 3.30 P. M. There was no wind at the time and hardly a ripple anywhere on the bay. I saw one Dovekie flying east through the bay and soon alight in the water. A few minutes later another bird was seen flying east near shore. It swung around Speonk Pt. going right over our decoys and alighted a few hundred feet off the Point and immediately began to dive. Both of these birds were flying low just skimming over the water and flew very fast much like a duck. I rowed out to this last bird and when within about fifty feet stopped to observe its actions. It did not seem to take any notice of me and kept right on diving. The water was six feet deep and the bird stayed under for about twenty seconds on each dive. It was calling continually just as it dove and again as soon as it reappeared on the surface; a faint call, repeated rather frequently and could be heard probably not over one hundred feet away. I could clearly see one bird as it swam under the water right after diving and it surprised me at the remarkable speed it made, working its wings vigorously to propel itself through the water.

Out of twenty-one stomachs examined, this bird's was the only one that held any food. It contained about twenty-five shrimp, each one-half inch long, three or four small shells, the rear half of a small fish (a whitebait

about one inch long) as well as a mass of what appeared to be some vegetable matter.

Out of about thirty Dovekies that I found only two had the breast feathers smeared with oil, all the others at the most only had a few scattered feathers with a slight trace of oil. All those that died from exhaustion were in very poor condition, the breast bone was very prominent and there was not a particle of fat on their bodies. On the other hand those that were shot were in much better condition with quite some fat.

One Dovekie was seen flying east through Moriches Bay at Speonk on December 4. Two were seen in the bay at Westhampton on December 12, which were the last observed in this region.

THE NUMBERS OF STRANDED BIRDS AND THE INLAND EXTENT OF THE FLIGHT.

The total number of Dovekies that reached our coast can never be determined even approximately, but the tabulations above suggest that it was very large. The most birds naturally were reported from thickly settled parts of the coastal region, and yet the evidence suggests that their corpses may have washed ashore and peppered the back country in equally large numbers all the way southward to the southeastern tip of the United States, and possibly also in the Bahamas and Cuba.

Mr. Winthrop Packard expresses the opinion that probably not one per cent of the birds that came inland in Massachusetts was ever observed. Most references to numbers of individuals are in general terms, such as Mr. H. H. Bailey's statement that "a tidal row" of bodies lay along the Florida beaches from Jacksonville to Key Largo. The only attempt at a statistical estimate that has come to our attention is that of Messrs. Silver and Carr. These observers believe that conditions on the Florida coast warrant a minimum estimate of 50 dead Dovekies to each mile between St. Augustine and Lower Matecumbe Key, or a total of 20,000 birds within the 400 mile stretch.

As to the maximum distance to which individual birds penetrated from the sea, this did not quite reach a hundred miles in any instance brought to our attention. We disregard the record from Cowansville, Quebec, which is about fifty miles east of Montreal and south of the St. Lawrence, because the Dovekie found there most probably had come up the river. On a few former occasions examples have reached the Great Lakes, and in November 1931

one was shot in Lake of the Woods, northern Minnesota (Roberts, T. S., Birds of Minnesota, 1932, Vol. I, p. 570, footnote).

The Dovekies found at Huntington, Amherst, and other places in western Massachusetts must have flown overland for 75 or more miles. Some of the Connecticut birds had doubtless crossed over Long Island and the Sound before passing the mainland shore. The specimen from Millbrook, Dutchess County, N. Y., was picked up alive at a point at least 85 miles from the ocean in a direct line. Several of the New Jersey birds were found 45 or more miles from the coast.

The chances against the finding of any particular bird that came down in the countryside are clearly very great. Despite the work of gulls, crows, vultures, opossums, cats, racoons, and carrion insects, all of which are reported to have devoured the carcasses, the remains of many not mentioned in our table have been stumbled upon at various dates since December. Dr. James P. Chapin, for instance, reports one on the salt meadows at Oakwood, Staten Island, on May 28, 1933.

BEHAVIOR AND CONDITION OF THE BIRDS

Free Dovekies on the ocean, during the earlier period of the influx, were seen by many observers on Long Island and elsewhere to swim strongly in rough water, plunge through the tops of combers, and take wing from the crests. Spent birds, on the other hand, particularly such as those reported by Messrs. Silver and Carr near Palm Beach, Fla., on November 29, were in obvious difficulty and would be bowled over by surf and battered ashore to succumb.

In windy waters of the Long Island south bays, on November 19, 20 and later, Dovekies were frequently seen to descend to the surface and seek the slender shelter or lee formed by wooden duck decoys. From such relatively smooth water they had no difficulty in taking flight, with or without the advantage of a breeze. They could rise equally well from the perfectly quiet surfaces of ponds, although at times they gained height too slowly to avoid obstacles back from the water. Thus Mr. F. V. Crane writes of one that struck a barrel after launching off from a tannery pond in Massachusetts. Again, Mr. A. G. Allen reports that on November 19

many Dovekies arose from a flock of between two and three thousand on ponds of the South Side Sportsmen's Club, at Oakdale, Long Island, but without attaining altitude sufficient to clear the surrounding trees. This doubtless accounted for the presence of scores of dead or moribund birds in the woods. The late Harold Herrick notes that a small flock entered another forest pond about a mile south of Peconic Bay, near Riverhead, Long Island.

Telephone wires presented obstacles beyond range of the Dovekies' experience. Many with gashed bodies were found under the lines in Massachusetts, New York, and New Jersey, and three or more observers saw birds fly full tilt against the wires.

Contrary to general opinion, and to many statements in the literature, the fresh and sound Dovekies were quite capable of taking wing from unencumbered land surfaces, at least if they had the advantage of heading into a fair breeze. No fewer than eight observers saw birds rise from concrete or other hard-surface roads, either to alight again after a short flight or to pass completely out of the range of vision. Mr. C. L. Fournier saw one take wing from the beach near Greenport, Long Island, and make its way safely out into Peconic Bay.

The swimming and feeding of the Dovekies was watched by many persons under exceptionally favorable conditions, in both salt and fresh water. At Martha's Vineyard, Mass., as reported by Mr. F. H. Kennard, a Dovekie in a pond easily outdistanced a water spaniel that pursued it. The bird would allow the dog to approach within a foot or so, and would then dive. The persistent dog finally had to be hauled into a boat, thoroughly done in, leaving the Dovekie fresh and untroubled.

At Norwood, Mass., Mr. F. V. Crane saw several swim for distances of from 30 to 50 feet beneath the clear water of a walled pond, and observed them chasing small fish and water-bugs, a thin trail of bubbles marking their erratic paths. Others likewise report the Dovekies finding food—small fish being the observed prey—in the fresh water of both streams and ponds.

The "underwater flight" of the birds was noted by Mr. Winthrop Packard in the Sharon, Mass., bird sanctuary pond. Mr. Marc C. Rich contributes the following note on diving Dovekies variously watched beneath a pier at Belmar, N. J., from a causeway

crossing Barnegat Bay, near the light-house at Barnegat Inlet, and in a salt pool at Great Kills, Staten Island. At the last locality the birds remained continuously for eight days, evidently throve, and were seen by many visitors.

All these birds were carefully observed for some time and always under ideal conditions, as we were directly over most of them at a height of a few feet. They invariably used their wings in swimming under water, exactly as in flying. They didn't seem to use their feet while under water, but the moment they came to surface and swam, their feet were used, not as side paddles, but more like the propellors of a ship, the feet being extended at full length from their rear end and paddled from that position. They were catching small "shiners" and seemed to be feeding incessantly.

Mr. O. H. Brown writes that two Dovekies watched in the harbor at Cape May, N. J., on November 24, swam beneath the surface with the wings slightly expanded, but without being used for making strokes. Their course was every moment marked by a chain of bubbles.

The more robust of the Dovekies, captured just from the sea along the beaches, were mostly active, lusty birds, that made a great commotion when put into a box, and quarreled with one another with much clatter and squeaking. Such birds sometimes attempted to bite the hand that grasped them. The greater number of those picked up, however, were so reduced by exhaustion that they showed little spirit. Sometimes, indeed, the only sign of life would be the frequent flashing of the eyelid (Cf. C. W. Townsend, Auk, Jan., 1933, p. 105). Such a state was widely mistaken for tameness, and indifference to handling was interpreted as a favorable reaction toward it.

The widespread humane interest in the waifs was not the least noteworthy feature of the influx. Telephone calls for information as to how they might be helped ran probably into hundreds or thousands. Many of the Dovekies were transported long distances, and at considerable pains, in order that they might be set free upon salt water. Some such were seen to swim, dive, and apparently feed, after as long as two days in captivity. Attempts to feed the birds by hand were not as a rule successful, although Mr. A. W. Howland reports that one in Newark, N. J., ate raw beef freely, and seemed strong when it was released. Another bird, domiciled over night in a gold-fish aquarium, was in the morning discovered

to be the sole remaining occupant! Doubtless most of the birds were too far gone to react to food. The substances offered to, or forced upon, the unfortunate creatures include sardines, tinned salmon, shrimps, cod-liver oil, meat, worms, bread, rice, bird-seed, and Irish moss!

The stomachs of most of the dissected victims were empty, but a few examples taken in the north contained remains of small crustaceans, fish (*Menidia*), and bits of sea-weed. Mr. H. H. Bailey reports that "seeds of our southern gulf stream kelp" were in the stomachs of several Florida specimens.

Most of the salvaged Dovekies were inordinately thin. No visible fat remained beneath the skin, which hung loosely over the shrunken pectoral muscles so that the keel of the sternum felt like a knife-blade. The rapidity of the wasting process is indicated by Dr. O. H. Austin, Jr., who states that within twenty-four hours at Cape Cod the strong and fat Dovekies had all been replaced by greatly emaciated birds. Unfortunately, he has not recorded the weight of Dovekies in the normal pink of condition.

We have the weights of 31 random birds, mostly picked up in the New York region, all within two days of November 20. These varied extraordinarily widely, or between 70.9 g. and 141.7 g. With a class range of approximately 7 grams, the frequency distribution falls as follows:

2	weighed	70.9 g.	3	weighed	106.3 g.
9	"	78	5	"	113.4
6	"	85	1	"	120.5
3	"	99.2	2	"	141.7

A Dovekie "in very good condition," taken by Mr. R. A. Johnson at Spectacle Island, Nova Scotia, in late December, had a wingspread of 394 mm., and weighed 127 g., from which it may perhaps be assumed that the heaviest specimens in the above table were birds that had not been at all reduced by starvation.

The physiological processes of birds are extraordinarily rapid, but the katabolic sequence during starvation and exhaustion is the same as among other vertebrates. As the first stage, the glycogen or animal starch in the muscles and the liver is used. This is followed by the combustion of fat throughout the body. Until

the glycogen and fat have been practically all utilized, the destruction of muscle fiber is very slight, but thereafter the protein of muscle tissue is drawn upon rapidly for the energy of life and movement. The heart is the last muscular tissue to be diminished.

Any starving animal reaches at a certain point a sudden toxic destruction of tissue, which represents the pre-mortal breakdown, and which is irreversible. During such a process of exhaustion and starvation the loss in body weight is very great indeed. Since skeleton, skin, and feathers are composed of material that is not combustible, a bird may literally become reduced to "skin and bones." Possibly as much as 90 per cent of its muscle tissue may be destroyed to supply energy before death ends the process. It is, therefore, not surprising to find that some of the Dovekies had lost half or more of their original weight.

THE NATURE AND ULTIMATE SOURCE OF THE INFLUX.

The Dovekies, like other pelagic birds, ordinarily waste no energy in fighting the gales of their oceanic range. On the winter feeding grounds they more or less drift with the prevailing wind, slowly while on the water, but becoming part of the more rapidly moving medium as soon as they take the air. Probably their tendency to work to windward prevents undue leeway in normal weather, besides which, winds from new quarters sooner or later bring their compensating force. But doubtless even a very strong and prolonged wind lacks any particular significance for the birds, unless it may eventually cause their planktonic food to descend to deep and inaccessible levels. Ordinarily, the Dovekies would merely move along contentedly and unconsciously with the wind, still within the range of their pasturage, until a leeward coastline set in motion a new series of reactions.

The situation is exactly the same as that of the strong-winged Procellariiform species. In the southern oceans many petrels spend their lives in a region of almost perpetual gales. Probably the strongest winds that blow cannot incommode them so long as they have sea room. But when chance and gales bear them down on such a lee shore as the west coast of Australia, for example, they face the unwonted but instinctive experience of *combatting* the wind, striving to keep off shore. The result is likely to be the same

for any species, however powerful on the wing. Rapid combustion of tissue is followed by exhaustion, and dying birds are washed ashore by breezes that would have no effect whatever upon them on the high seas.

This hypothesis fits the case of the Dovekies along our Atlantic coast, While the strong coastal winds from the sea were the immediate agency in scattering the birds over so many states and counties, it is altogether likely that antecedent and somewhat irregular weather conditions over the North Atlantic had first moved masses of them close to the coast of New England and the Middle Atlantic States. The root of the matter is not that the Dovekies were blown inland, but that their oceanic population was so near our continental shore—which had been for some time prevailingly a lee shore—that the birds were inevitably blown inland when buffeted by sudden onshore storms. As Mr. Lee S. Crandall has written,

> —rains fall and winds blow during every winter season, without bringing us showers of Dovekies. Each year the birds are called upon to face conditions at least as severe as those of the 19th of November, and each year they triumphantly survive.

However, while the prevalence of unusual easterly winds in the normal west wind zone of the North Atlantic might offer a satisfactory explanation of the influx of the Dovekies into New England, New York and New Jersey, it hardly tells the whole story. Why did the flocks continue southward, long after the subsidence of unfavorable weather conditions, toward such new fields as Florida and Cuba? A possible suggestion as to the reason for the untoward condition and reactions of the birds is found on page 124 of Dr. G. M. Allen's 'Birds and their Attributes':

> The Little Auk or Dovekie is also a plankton feeder, rather than a fisher, and finds certain times of day best for feeding when these minute animals are nearer the surface. In times of rough weather this floating life seeks deeper levels, so that the English ornithologists have explained the occasional great disasters that overtake the Little Auks, bringing hundreds of them inland with empty stomachs, as due to a continuous spell of bad weather resulting in the temporary disappearance of that plankton, and so depriving the birds of food and strength to stand against the elements.

Such an effect might well apply with even more force to littoral waters, into which the birds had drifted before the wind, than to the outer ocean.

Possibly, however, the Dovekie influx has a broader significance than any thus far suggested. In some respects the recent movement seems to fulfil the requirements of "mass emigration," as defined in, 'Emigration, Migration and Nomadism,' 1931, by the late Dr. Walter Heape of Cambridge University. This author presents a detailed study of such movements among lemmings and related rodents, ungulates, such birds as Sandgrouse, many lower vertebrates, and a wide variety of invertebrates.

Mass emigration is induced by overpopulation, which is in itself due to complex causes and which may recur within a given species at intervals of from seven to fifty or more years. The act is then performed by a surplus population, and it takes a direction away from or beyond that of the normal movements of the species, in order to avoid "territory" already fully occupied. It assumes the form of a rush emigration, implicating hordes of individuals, and is accompanied by a peculiar herd psychosis, which Heape calls animal hysteria, and which alters many of the ordinary reactions of the creatures. An inevitable result of such a movement is the death of the vast majority of the emigrants. A wealth of the factual minutiae which form the basis of this bare sketch is given in Dr. Heape's illuminating work.

As applied to the Dovekie influx, this theory is highly speculative, for we have as yet no other evidence of a rhythm of overproduction. Nevertheless, the behavior of the birds, especially along the southern Atlantic coast, fits the pattern that Heape has outlined for a variety of animals. Moreover, Messrs. Silver and Carr, who stress the fact that the southward progress of the Dovekies continued long after the alleged meteorological stimulus had ceased, remark "it seems certain that none of them survived."

As yet we have no information that might enable us to link up the Dovekie flight with any of the known rhythmic phenomena correlated with sunspot cycles, such as "plagues" of rodents, southerly incursions of Snowy Owls, etc.

To continue in the realm of the speculative, Mr. John Treadwell Nichols has made the interesting suggestion that the hordes of Dovekies along our coast may not have been the normal winter visitants from the American Arctic, but may have come from Old World breeding grounds. Long continued easterly winds in the

North Atlantic may have assisted such a movement, especially if the phenomenon of mass emigration was also involved. The Old World birds, incidentally, appear to migrate regularly to more southerly latitudes than the ordinary wintering Dovekies of our American coast. Furthermore, such visiting flocks from the eastern Atlantic would presumably become more easily "lost" in strange waters, with the extraordinary results that we have witnessed. It is highly notable that our abnormal visitors of late November and early December promptly disappeared from the whole central and southern Atlantic coast, leaving not a trace. On the other hand, the Christmas census of 'Bird-Lore' shows that from Essex County, Mass., northward, the normal winter resident birds were present as usual. May not these have represented practically the only annual guests from the Greenland region to be with us during the whole season?

Many, perhaps hundreds, of the Dovekies were banded and released during the influx. Some day a few returns may help to resolve one or more of the many puzzling questions.

Amer. Museum Nat. Hist., New York.

GENERAL NOTES.

A Record Colony of Yellow-crowned Night Herons.—I had long thought that the Yellow-crowned Night Heron is much less gregarious than the black-crowned species, and that its breeding colonies are limited to groups of but a few nests, sometimes placed alone, sometimes built within a rookery of other herons. The literature seems to bear out this impression. I was considerably surprised, therefore, to receive from Mr. J. J. Carroll, of Houston, Texas, a letter dated March 31, 1932, stating that he had found two colonies of 150 to 200 birds at Eagle Lake, Texas.

In the spring of 1932, while engaged in field work in Louisiana, I investigated a heronry which, in number of Yellow-crowns, so far transcends even Mr. Carroll's remarkable colonies that I believe the facts worth recording in some detail.

The rookery occupies an extensive shallow pond called Gros-bec Lake, in Pointe Coupee Parish, about four miles northwest of Lottie. The lake is about two miles long, east to west, and about one mile wide, and so overgrown with vegetation that practically no open water is in evidence. It has always been the site of a large rookery.

I visited the lake on May 20, under very unpropitious circumstances, but remained long enough to count 85 Yellow-crown nests in the southwest corner, and to wade through a near-by colony of mixed Snowy Egrets and Little Blue Herons whose nests, often several to a bush, were too numerous to count.

A more thorough investigation was made of the rookery on June 3 and 4. At this time 372 Yellow-crown nests were counted while cruising the southern side of the lake. Many others were seen along the northern side, as well as some in the colony of Snowies and Little Blues, that were not counted. Because merely a running count was made of the nests seen as we waded along the margins of the lake, and no attempt was made to get a complete census, it would seem reasonable to assume that not more than half of the nests present were included in the count. On such an assumption, an estimate of 1000 nests might be made.

The young were of various ages, most of them well developed, and many were able to fly from bush to bush. Some were already fishing for themselves, but in one nest there were eggs just hatched and another nest contained a single egg. Three nests were found to contain five young each, and two held six each, though four seemed to be the usual number.

The food of the young seemed to be wholly crawfish, and the nests could be distinguished at once from those of the American Egret and Water-Turkey, with which they were associated, by the pink color of the excrement which covered them.

Besides Yellow-crowns, Snowies, and Little Blues, Gros-bec Lake also harbored a splendid colony of American Egrets, scattered in small groups

along the north side of the lake. A running count of 153 nests was made while cruising that section. Young were of different ages, some almost ready to quit the nest.

Alternating with the groups of American Egret nests, were 102 nests (also in small groups) containing downy young Water-Turkeys. An additional 49 nests were counted on the southern side of the lake. Usually there were three young to the nest, but nests were seen with two, four, and even five young.

Green Heron nests, as usual, were found here and there about the lake, and a single fledgling White Ibis was seen; while a few nests of Ward's Herons occupied the tops of tall trees well out in the lake.

Because of the importance of the Gros-bec Lake rookery and the perennial appeal of fat gros-becs (as the young night herons are called) to the Creole palate, steps were immediately taken to make Gros-bec Lake an Audubon sanctuary. A special warden now guards the colony.—Ernest G. Holt, *National Association of Audubon Societies, New York City.*

Definite Breeding of the Glossy Ibis in Louisiana.—In the fourth edition of the A. O. U. 'Check-List' (1931, p. 33) it is stated that the Eastern Glossy Ibis breeds "rarely and locally in central Florida and probably in Louisiana." Stanley C. Arthur's 'Birds of Louisiana,' published anonymously later in the same year by the Louisiana Department of Conservation (Bulletin No. 20, p. 101), lists the bird as resident, "but decidedly uncommon," though no breeding data are given, nor do I find positive breeding records elsewhere. I am glad, therefore, to be able to supply one.

On May 25, 1932, in southwestern Louisiana I came, under the guidance of two Creoles, upon a remarkable assemblage of birds nesting in the open coastal marsh of Cameron Parish. This rookery, said to be at least ten years old and to cover perhaps ten acres of bull-rush and cut-grass marsh, contained hundreds of Glossy Ibises, Snowy Egrets, and Louisiana Herons, together with a few American Egrets and Black-crowned Night Herons.

The nests of all were constructed usually of the materials at hand—stalks of bull-rush and cut-grass—though some contained twigs, necessarily brought from a long distance. These structures were woven about the stems of the living grass and rushes, and varied in elevation from near water level to three or four feet above it. The bottoms of several Black-crown nests actually touched the water. The nests of this species were consistently low, but there were also some low nests of the Snowy Egret and Louisiana Heron. The depth of the water was about half-way to the knee.

Snowy Egret young ranged in development from hatching eggs to fledglings out of the nest, and the Louisiana young also were of various ages; Black-crowns had eggs, as well as young able to scramble about; while the single nest seen that could be certainly ascribed to the American Egret contained seemingly fresh eggs.

The Glossy Ibises were all hatched except for an occasional egg that may

have been addled. In one place a score or more young, just able to make short flights, were huddled beside a similar group of young Snowy Egrets, but not mixed with them.

Adult after adult ibis was carefully scrutinized through a 6-power binocular, but not one was seen with a white face. In fact during my entire stay in Cameron Parish the white-faced species eluded me.—ERNEST G. HOLT, *National Association of Audubon Societies, New York City.*

The Glossy Ibis in Georgia.—On April, 1933, the first Eastern Glossy Ibis (*Plegadis f. falcinellus*) to be seen by ornithologists in Georgia was noted on Cumberland Island, the Carnegie estate on the St. Mary's River. The bird was in company with Little Blue and Snowy Egrets, and American Egrets, in a long slough near the ocean beach. The writer, with Messrs. E. B. Chamberlain and H. R. Sass of Charleston, S. C., and Mr. Robert Ferguson who lives on the island, studied it as short range for a quarter of an hour as it fed and preened at a distance of about one hundred yards.

Realizing the rarity of the bird, an attempt was made to collect it, but though we followed it from one slough to another most of the afternoon, it eluded us. We had frequent views of it, at rest and in flight, and at no time was there any difficulty in seeing the decurved bill and even the iridescence of the chestnut plumage. The writer communicated with Mr. Arthur H. Howell of the Biological Survey in regard to other records for the state, and he says that the above bird is "apparently the first specimen."—ALEXANDER SPRUNT, JR., *92 South Battery, Charleston, S. C.*

Greater Snow Goose at Troy Meadows, N. J.—On the morning of April 2, 1933, while in Troy Meadow, a rather extensive fresh water marsh in Morris County, N. J., I noted a flock of about 100 Snow Geese passing over. It is generally understood, I believe, that when flocks of Snow Geese are seen in this locality, they may be safely referred to the greater race, *Chen hyperborea atlantica.*

They were flying at an altitude of about 1,000 feet, and the black wing tips were clearly discernible. A strong southerly wind had been blowing all night and it is probable that the birds were taking advantage of this in their migration.

There appear to be very few records of flocks of these birds in passage, but from those available to me it would appear that, wintering chiefly along the North Carolina coast, they concentrate early in the spring in Delaware Bay, and from there follow a quite direct line through New Jersey, part of New York and New England to their second concentration point in the St. Lawrence River, and from there north to their Arctic breeding grounds.

There are only a few records of the birds being observed on the water between concentration points; that of Fisher at Ossining in 1882, and an earlier fall record also by Fisher at Lake George, while Dr. Stone calls my attention to an account by Julian Burroughs (Forest and Stream, Jan. 23,

1909, p. 133) of a large flock alighting on the Hudson opposite Gordon's Point in a fog, several being shot. It would seem probable, therefore, that the flight from Delaware Bay to the St. Lawrence River is usually completed without interruption.

Although there are many records of single birds or small flocks seen at widely separated points, the larger flocks as noted by Carter at Boonton, N. J., in 1924, by Broun at Lenox, Mass., in 1931, and one or two other New England records, seem to bear out pretty well that the line of migration indicated is the one usually followed and that these geese do not pass up the coast.

It appears that the entire flock of from 7,000 to 10,000 geese was found in Delaware Bay on March 26, 1933; on April 2 one small flock was seen and on April 7 apparently all of the birds had left. The geese do not start in one large flock but leave in smaller bands.

It is rather unusual that we should have so few records of the migration of birds so easily recognized as the Snow Goose. It may be easily believed, therefore, that they pass over at so great an altitude that they are seldom seen.—Charles K. Nichols, *Ridgewood, N. J.*

The Blue Goose in North Carolina.—The April number of 'The Auk' contains a record of the occurrence of the Blue Goose (*Chen caerulescens*) in Alabama and Maryland. On February 3, 1932, the writer observed at rather close range and with the aid of 8-power binoculars a Blue Goose at Mattamuskeet Lake, North Carolina. The bird was in company with about 250 Canada geese. Pearson, Brimley & Brimley, in their 'Birds of North Carolina,' p. 87, record one individual captured on Bogue Beach near Fort Macon in the spring of 1884, but Mr. Brimley, in a letter dated February 25, 1907, wrote that probably this record is an error. There is, however, a record for Currituck Sound (Auk, 1931, p. 111). From the files of the Biological Survey I find that W. F. Kubichek, formerly of this bureau, observed a Blue Goose in company with Black Ducks on Knotts Island, near Currituck Sound, North Carolina, on November 17, 1919.—Clarence Cottam, *U. S. Biological Survey.*

The Pintail Duck (Dafila acuta tzitzihoa) Wintering in Maine.—In 'The Auk' for 1912, pp. 235–236, the writer gave data on the wintering of the Pintail on the coast of Maine. Since that time additional and conclusive evidence has accumulated.

On December 20, 1925, I saw five Pintails in Back Cove, Portland, while Walsh in 1926 reported the bird as remaining in the vicinity of Mare Point, Brunswick, as late as December 7 (Maine Naturalist, VI, p. 12).

Since the winter of 1927–28 this bird has been a regular winter resident at Back Cove, Portland; during that season a dozen including both sexes were present from November 12 to March 10. During the season of 1928–29 about a dozen, both sexes, were observed from October 13 to March 29 and on March 9 the males were courting and the birds quite vociferous.

In 1929–30 a flock numbering, on several occasions, forty-three birds of both sexes was observed from October 12 through the first week of April and in 1930–31 both sexes were present from October 25 until March 21; The number varied from 85 in November to 50 in January and 25 in February.

In the season 1931–32 about 25 were present from October 12 to April 1 and in 1932–33 about 50 from October 14 to March 27, both males and females. They were vociferous on December 26, 1932, and on fine days after that. The drakes began courting on January 29.—ARTHUR H. NORTON, *Museum Natural History, Portland, Maine.*

The European Widgeon (Mareca penelope) again in Maine.—Since recording this species as new to the state (Auk, 1913, p. 574) the writer has acquired three and examined four more specimens from Maine, viz.: (1) a young male, Scarborough, October 29, 1917, in my collection; (2) a female taken about a month prior to November 28, 1923, in Merrymeeting Bay (Walsh, Maine Naturalist, VI, p. 11), seen in a taxidermist's shop; (3) a young male molting into adult plumage, Falmouth, December 7, 1923; (4) another very similar specimen taken at Cape Elizabeth a few days later; (5) an adult male seen at Falmouth April 20, 1926, and a male and female in my collection taken in Scarborough, November 14, 1930, the male being well advanced toward adult plumage.

From these records it appears that the European Widgeon has occurred casually in Maine from September 11 to December 7, and in spring April 20.—ARTHUR H. NORTON, *Museum of Natural History, Portland, Maine.*

Teals Resting on Plowed Ground.—At Cameron's Pond, near Lexington, Virginia, on March 28, 1933, a pair of Blue-winged Teals and two female Green-winged Teals came flying in. As they saw us they turned, circled the pond, and again flew past low over the water, but instead of stopping on the pond lit in a newly-plowed field a couple of hundred yards away. As we approached they slowly walked through the field to the top of a low hill and when flushed lit once more in the field but farther away. Nothing was growing in the field. Both species of teals are said to feed in grain fields during the breeding season but I have never known them to stop to rest on high land at this season.—J. J. MURRAY, *Lexington, Virginia.*

Blue-winged Teal Breeding in Cheshire County, New Hampshire.—The probable breeding of *Querquedula discors* on the Connecticut River in town has been suspected for some few years and on July 24, 1932, I surprised a Blue-wing with her brood of four young, resting quietly on the water.

The female immediately gave a low, querulous cry of warning and the ducklings dove from sight, inshore. In an attempt to attract out attention the female proceeded to swim slowly out into the river, beating the water with her wings to draw our notice more than as a means of locomotion,

keeping her head turned to watch us as she continued to the Vermont shore. One youngster dove and swam along with her, under water. She was apparently aware of its presence for, when about fifty yards out, it bobbed to the surface, she turned and slapped the water, causing it to dive and return to shore. A hundred yards of sustained under-water activity for a duckling seems noteworthy.

The young came on shore and flattened out on the sand, but when I approached they dove again returning to land after a short swim. Their calls were in two, three or four syllables: *week, week, week.* When they called and dove a second time, the female arose from the water on the Vermont side and crossed the expanse of river swiftly and suddenly. The young showed no feathering except on the wings and were apparently less than two weeks old.—Lewis O. Shelley, *East Westmoreland, N. H.*

Golden Eagle in Louisiana.—The strange omission of the Golden Eagle from 'Birds of Louisiana' (Bull. 20, La. Dept. of Conservation, 1931) and Lowery's remarks, "The bird has been reported from all sections of the state, but the writer suspects that many of the reports are without substantial foundation" (La. Polytechnic Inst. Bull. XXIX, 1931, 21), have led me to examine the record.

Beyer, Allison, and Kopman (The Auk, 1908, 442) cite a specimen taken at Jackson, La.; Arthur (Bull. 5, La. Dept. of Conservation, 1918, 48) mentions a definite capture in Washington Parish; and Kopman (Bull. 10, La. Dept. of Conservation, 1921, 93) says, "At least one specimen taken in the state may be found in the Louisiana State Museum in New Orleans." Kopman does not indicate, however, whether this specimen formed the basis of one of the previous records.

I myself have examined a mounted Golden Eagle in the Museum of the Louisiana Department of Conservation, New Orleans, that was killed in December, 1925, on Bayou Maringouin, near Maringouin, Iberville Parish, by Edward L. Green, of Lottie, another being reported as seen at the same time.

Through the courtesy of the late Edward Stiles Hopkins, I can add yet other records for the state:

A mounted specimen seen by Hopkins at Bogalusa, Washington Parish, September, 1927, that had been killed in the neighborhood several years before. (There is a possibility that this is the same bird reported by Arthur in 1918.)

Two mounted specimens examined by Hopkins in a hardware store at De Ridder, Beauregard Parish, October, 1928, killed in the vicinity some years previously.

Two mounted specimens in the Louisiana State Museum, New Orleans, collected by Alfred M. Bailey at Avery Island.—Ernest G. Holt, *National Association of Audubon Societies, New York City.*

Broad-winged Hawks and Starlings.—Mr. Maurice Brooks records in the April 'Auk' the peculiar behavior of Cooper's Hawks and Starlings

which recalls a similar experience of my own. On September 25, 1925, at Ipswich I observed a Broad-winged Hawk (*Buteo p. platypterus*) drifting along before a strong northwest wind near a flock of at least a thousand Starlings. The latter were performing evolutions in mass formation and from time to time would envelop on all sides the hawk. Occasionally the hawk would descend out of the throng of Starlings but would at once return into their midst. At no time did the hawk or Starlings appear to attack. I recorded in my notes that it seemed to be "merely play," thus agreeing with the conclusions of Mr. Brooks. Two years later, on October 7, I saw a similar action of Broad-winged Hawk and Starlings.—CHARLES W. TOWNSEND, *Ipswich, Mass.*

Eastern Red-tailed Hawk Breeding on the South Carolina Coast.—On March 28, 1933, three heavily incubated eggs of *Buteo borealis borealis* were collected from a nest in a loblolly pine, fifty-one feet above ground, on John's Island, Charleston County. One parent flushed from the nest and both remained in the vicinity for over an hour. It is estimated that the eggs would have hatched in less than a week. Allowing an incubation period of 28 to 32 days, would place the laying date during the first week in March.

At the time the writer was aware of no other breeding records for this coast. However, Mr. H. L. Harllee, of Florence, S. C., has since reported that in April, 1932, he found two nests of half-grown young, and on February 16, 1933, a nest of two eggs. All near Dale, Beaufort County.

A. T. Wayne (Birds of S. C., pp. 73–74, 1910), considered this species a winter visitant, leaving the coastal area in March and breeding in the interior of the state. In later years other observers have reported it during the spring and summer months.—E. B. CHAMBERLAIN, *The Charleston Museum.*

The Western Pigeon Hawk in Florida.—In a recent examination of our collection of Pigeon Hawks I have found a male of the western race (*Falco columbarius bendirei*) collected at Key West, Florida, April 3, 1886, by naturalists of U. S. S. Fish Commission Steamer 'Albatross.' The specimen (U. S. N. M. No. 108,868) is paler above than normal in *bendirei*, approaching *Falco c. richardsoni* in that respect, but has the tail band colored as in *bendirei*. Mr. J. L. Peters, who has examined it at my request agrees with me that it is nearer the western form and should be so identified.

This makes the third recorded specimen of this bird from Florida. A. H. Howell in his work 'Florida Bird Life' (1932, p. 190) having listed two others from Tortugas Keys, April 8, 1890, and Key West, October 27, 1986.—ALEXANDER WETMORE, *U. S. National Museum, Washington, D. C.*

Notes on the Prairie Chicken in Indiana.—For the last twenty-five years the Prairie Chicken (*Tympanuchus cupido americanus*) has been considered very rare in Indiana. It is now extinct in many areas, but in the prairies of the state a few remain usually in small flocks.

During March, 1933, at the Jasper-Pulaski Game Preserve, in the southern part of the old Kankakee marshes, I discovered one hundred and fifty Prairie Chickens which had wintered, roosting each night in a section of prairie, south of the Ryan's Ditch, in the very heart of the preserve. This roosting place unlike much of the preserve was not covered with prairie grass but with a thick tangle of willows and briers. The big flock had broken up before my arrival and from nine in the morning until about five in the afternoon, smaller flocks could be observed feeding in various corn fields. The numbers noted ranged from one to forty, the larger assemblages after heavy snows or severe weather. A few days after each storm, when the weather became better, they broke up again.

On the afternoon of March 24 at 6:15 I heard the slow rythmatic booming of Prairie Chickens, less than half a mile east of us and about a mile from their roosting place. Apparently about thirty to forty chickens were booming at the same time, and the booming continued loud and clear for twenty minutes, after which it ceased abruptly just as darkness began.

We have estimated that this flock of one hundred and fifty given a good breeding season will increase to about five hundred next fall.—Sidney R. Esten, *4112 Graceland Ave., Indianapolis, Indiana.*

Some Feeding Habits of the Solitary Sandpiper.—In August 1932, alongside a stagnant pool 15 by 6 feet in a brook bed, a Solitary Sandpiper (*Helodromas s. solitarius*) fed for five consecutive days. Conditions for observation were most favorable, the bird being within 25 feet of me and usually much nearer. Other Solitaries were daily visitors to the pool, arriving in late afternoon and leaving in some twenty-four hours.

By draining the pool once or twice each day about an inch additional food was exposed, and the bird in question would slowly walk again and again around the margins, gleaning the food newly uncovered.

Most of the time was spent in taking from the surface, within reach of the shore, minute aquatic life, indistinguishable with binoculars. Other food came from the wet margin of the pool. From this narrow area hellgramites and other forms sought the water and were snatched up. The pool was thickly infested with small pollywogs and tiny shiners that swam in schools. The bird pursued both on a spurt through the shallows. Pollywogs were twisted more or less between the mandibles until stilled, then the bird tipped its bill upward and swallowed them often with much gulping. In a little more than a half hour twelve shiners, sixty pollywogs, five large hellgramites, seven caddis-fly larvae, and many small flies attracted to the water, besides other minute forms, were eaten. The bird was seen to take up small snail shells—which were abundant—and extract the snail with one flirt of the bill that also discarded the shell. Once when a hellgramite bit onto the lining of the bird's bill it shook its head vigorously to loosen it and, flipping it free, dashed into the water for it and this time minced it well by rolling it between the mandibles before attempting to swallow it. The occasional plop of little frogs (just out of the pollywog

stage) near it, always startled the sandpiper and caused it to jump entirely off the ground with raised and quivering wings. Yet when two horned-pouts ventured from the murky water to the shallows and thrashed about close to the bird it showed no alarm. Its low *peet* was given about once a minute, regularly, and sometimes twice in succession.—LEWIS O. SHELLEY, *East Westmoreland, N. H.*

A Willet in the Connecticut Valley in New Hampshire.—On August 14, 1932, in Walpole, N. H., in a dry stubble field one hundred and fifty yards from the Connecticut River, a Willet (*Catoptrophorus s. semipalmatus* or *C. s. inornatus*) was flushed and was afterwards leisurely observed through binoculars. When it took wing it gave a call note *pil-willet*, which was repeated at intervals while in the air. The only other regional record that I have of the Willet is a bird seen on July 8, 1931.—LEWIS O. SHELLEY, *East Westmoreland, N. H.*

Northern Phalaropes on the New Jersey Coast.—On May 6 during a strong northeast wind with fine drizzle of rain I saw a hundred or more Northern Phalaropes (*Lobipes lobatus*) flying over the surf at Stone Harbor, Cape May Co., N. J. They alighted on the water and arose again to escape a breaking wave. Several of them driven onto the beach by the wind fed for some minutes at a time with the Semipalmated Sandpipers and Semipalmated Plover, or sat directly on the sand with head and neck erect; others swam and spun about on shallow beach pools above the high tide line.

The day following Mr. Joseph W. Tatum reported some of these birds accompanied by a few Red Phalaropes on the ocean just beyond the surf, off Long Beach, a little farther up the coast, while some of the Northern Phalaropes were also seen at Cape May City.—WITMER STONE, *Academy of Natural Sciences, Philadelphia.*

Second Occurrence of Northern Phalarope in South Carolina.—On May 30, 1933, a female Northern Phalarope was seen at the U. S. Wild Life Reservation, Cape Romain, S. C., by the writer, in company with Messrs. H. F. West, E. A. Simons and Andrew Simons. The bird was first noted just beyond the surf in the ocean and as soon as binoculars were trained upon it, it was evident that it was a Phalarope. Hardly had we focussed it, however, than the bird arose and flew straight in to the beach, alighting not twenty-five feet from us.

It was then that we saw it to be a female *L. lobatus* in high plumage. The bird was in rather bad shape, one leg dangled very loosely, and as it sat on the sand, the head drooped perceptibly. The writer walked up once, to within ten feet of the bird as it sat motionless on the sand. It took flight twice, circled a little, and alighted again. Finally it took off and flew out over the ocean, alighting there.

This is the first specimen actually observed alive in the state. On June

3, 1903, a cat, belonging to the late Arthur T. Wayne, brought a wing of one of these birds into his house and thus established the first record for the species. (Auk, Vol. XXII, 397.) The writer has just received a message from Mr. Ivan Tomkins of Savannah, Ga., stating that he collected a female Northern Phalarope in the Savannah River on May 24.—ALEXANDER SPRUNT, JR., *92 South Battery, Charleston, S. C.*

Wilson's Phalarope (Steganopus tricolor) in Berkshire Co., Mass.—On May 16, 1933, Miss Margaret Hightower, of the Berkshire Museum staff, and the writer visited some drainage flats about three miles southeast of Pittsfield late in the afternoon. Much to our surprise we saw, with some Lesser Yellow-legs and Least Sandpipers, a female Wilson's Phalarope. We observed it for half an hour with 7-power glasses at a distance ranging from twenty-five to thirty feet. The bird was very tame and paid no attention to us. It could not be found on the following day.

According to Forbush this species has not been recorded in New England since 1909 and in Massachusetts since 1907. All previous records have been obtained along the coast and most of them in the fall. Incidentally Pittsfield is 150 miles from both Boston and New York and is a little over a thousand feet in altitude.—G. BARTLETT HENDRICKS, *The Berkshire Museum, Pittsfield, Massachusetts.*

Golden Plover, A New Species for Alabama.—On March 26, 1933, Kenneth Edwards and Homer Flagg, of Fairhope, Alabama, found a Golden Plover (*Pluvialis dominica dominica*) in a ditch near Foley, Alabama. The bird was apparently exhausted and unable to fly. It lived only a day or two. Mr. Francis M. Weston, Jr., of Pensacola, Florida, has seen the skin and confirmed the identification.

This apparently adds a new species to the Alabama state list, since Arthur H. Howell in 'Birds of Alabama' includes it only hypothetically on the assumption that it must have occurred some time in the past and cites no definite records. The skin has been sent to the National Museum, Washington, D. C.—HELEN M. EDWARDS, *Fairhope, Ala.*

Black Terns at Harrisburg, Pa.—Two Black Terns spent May 10 and 11, 1933, flying over a small lake in a city park in Harrisburg, Pa. There are no previous records of this bird for the county. Leo A. Luttringer, Jr. of the State Game Commission, saw six Black Terns while fishing in the Susquehanna River eight miles above Harrisburg on August 22, 1928, and several immature birds on the 25th. His locality was the west bank of the river, in Perry County.—HAROLD B. WOOD, *3016 N. Second St., Harrisburg, Pa.*

Terns near Phoenixville, Pa.—On May 10, 1933, I saw two terns, apparently the Common Tern (*Sterna h. hirundo*) flying about the duck ponds on my game farm, on Pickering Creek, three miles from Phoenix-

ville, Pa. It is the first time that I have seen terns here in seventeen years' observation and Dr. Witmer Stone tells me that he recalls scarcely any inland records of these birds in eastern Pennsylvania.—FRANK B. FOSTER, *Phoenixville, Pa.*

Laughing Gull Breeding on the South Carolina Coast.—On May 23, 1933, Messrs. G. R. Lunz, Jr., J. P. Deveaux, III, and the writers found a nest and two eggs of the Laughing Gull (*Larus atricilla*), on White Bank, Bulls Bay, Charleston Co., S. C. Two adult gulls were flying about the immediate vicinity and attention was attracted to the nest because of the repeated swooping down and alighting nearby of one of the birds. Two other gulls were noted in the general vicinity.

The nest, a hollow in the broken shell, rather well lined with dead sedge of the salt marsh, was near the base of a small clump of sea oxeye (*Borrichia* sp.). Within a few yards were two nests of the Eastern Willet, and farther away, but on the same bank, were nests of Wilson's Plover, Oystercatcher, Louisiana Heron, and Boat-tailed Grackle.

In order to make further observations one member of the party concealed himself in a nearby clump of salt myrtle (*Baccharis* sp.), while the others left the bank. During the succeeding two hours one or both of the gulls alighted twelve times within a few feet of the nest, and four of these times one bird walked in to the nest, remaining only a few moments. Not once did a gull alight anywhere else on the bank. The conclusion was reached that the eggs (which were not disturbed) were fresh and that the birds had not started setting.

This constitutes the first breeding record for South Carolina, although for some years the presence in the breeding season of adult birds had caused speculation as their status here.—E. M. BURTON AND E. B. CHAMBERLAIN, *The Charleston Museum.*

Brünnich's Murres (Uria l. lomvia) Feeding in Fresh Water.—On December 15, 1932, Brünnich's Murres were reported at Quebec, flying up the St. Lawrence River in considerable numbers. I first saw them at Montreal on December 22 when three flocks passed in front of me on the Longueuil shore below the Harbour Bridge in the space of a few minutes. All alighted on the water higher up, the river being open at the time except for shore-ice and floating cakes. I estimated the three flocks to contain 85 birds; there were also others present some way offshore, which bring up the total to about a hundred birds in a very restricted area.

The following day I went out to see more of the birds, but after a long search found only two, in a channel between Ile Verte and the south shore, about two miles below Longueuil. Both were feeding, about 200 yards apart, appearing from time to time for a few seconds between dives. Not without difficulty these were collected, and their stomachs found to be full of fish.

No. 1. Female: length 15.2 in., closed wing 7.85, bill 1.12.

	No. of fish	Wet weight
Pimephales notatus	14	40.5 gm.
Percopsis guttatus	3	7.4
Perca flavescens	2	7.5
Ambloplites rupestris	2	1.5
Boleosoma nigrum	21	6.8
Total	42	63.7 gm.

There was also a pink quartz pebble.

No. 2. Male: length 15.5 in.; closed wing 8.0, bill 1.10.

	No. of fish	Wet weight
Pimephales notatus	11	15.0 gm.
Notropis cornutus	1	0.3
Perca flavescens	2	5.8
Ambloplites rupestris	2	1.5
Boleosoma nigrum	21	6.8
Total	36	27.2 gm.

These facts are of some interest in view of the almost entire absence of records of Brünnich's Murres taking food during their periodical "irruptions" into fresh water. Mr. J. H. Fleming, in his well-known report (Proc. IVth Int. Ornith. Congr. in London (1905), pp. 528–543, 1907), cites only one case where there is no question that the fish were actually taken in fresh water, namely on February 23, 1895, at Toronto, when "Mr. Samuel reported a specimen 'that contained remains of fish'." It is of course true that the majority of specimens obtained during these invasions are picked up on land, either alive but exhausted or already dead, and naturally their stomachs are empty. The numerous inland records in February and March, however, considered in conjunction with the difficulty of collecting specimens in partly frozen waters, point to the conclusion that these birds feed in freshwater more commonly than is generally supposed, and in some cases live there for weeks if not months.

Thirteen birds were seen from the Victoria Bridge on December 25, also apparently feeding, but none after that date.

There is an unrecorded specimen of Brünnich's Murre taken at Lac St. Louis, Montreal, December 7, 1925, in the McGill University collection.—V. C. Wynne-Edwards, *McGill University, Montreal.*

West Virginia Breeding Record for the Saw-whet Owl.—On June 22, 1932, an immature Saw-whet Owl (*Cryptoglaux acadia acadia*), was collected near Cranesville, Preston County, West Virginia, indicating the first breeding record for this species in the state.

One of the students of the Oglebay Park Nature School, Mr. Millard Griffin, discovered the young owl in a clump of hemlocks growing in a

swamp, and Mr. R. L. Fricke, of the Carnegie Museum, Pittsburgh, a member of the school staff, captured it with a butterfly net.

The owl was kept alive at the camp of the Nature School, at Lake Terra Alta, for several days, but died soon after being taken to Pittsburgh and was mounted for the Carnegie Museum.—A. B. Brooks, *Oglebay Park, Wheeling, W. Va.*

Chuck-will's-widow again in Ohio.—A Chuck-will's-widow (*Antrostomus carolinensis*) was taken near the western limits of the city of Dayton, Montgomery County, Ohio, on May 1, 1933. It was shot by a man who stated it was flying about during daylight over his chicken yard. I examined and measured the bird which was a female. This is the second recorded occurrence of the species in Ohio and this locality is at least fifty miles north of the spot where the first specimen was secured by E. S. Thomas in May, 1932. (Auk XLIX, October, 1932, p. 479.)—Benedict J. Blincoe, *Dayton, Ohio.*

An Old Specimen of Hybrid Flicker from Central Arkansas.—In the Museum of Natural History, University of Iowa, there is a hybrid Flicker, a cross between *Colaptes auratus* and *C. cafer*, taken near Palarm, Faulkner County, Arkansas, March 26, 1882. It is a male, No. 13392, and was collected by D. H. Talbot and skinned by W. B. Parker.

The basal portions of the feathers forming the red "mustache" marks are black. The webs of the rectrices, primaries and secondaries are dull yellow, while the shafts are orange-rufous (of Ridgway).

Baerg (Ark. Station Bull., 258, 1931, p. 87) records but one occurrence of *Colaptes cafer collaris* for Arkansas.—Philip A. DuMont, *Museum of Natural History, University of Iowa, Iowa City, Iowa.*

Nesting of the Rough-winged Swallow in Montana.—The statement is sometimes made, on excellent authority, that Rough-winged Swallows (*Stelgidopteryx ruficollis serripennis*) do not excavate their own nest burrows, as for example by A. A. Allen (Bird-Lore, XXXV, p. 122). In the valleys of northwestern Montana, however, Rough-winged Swallows regularly excavate their own burrows, as already mentioned by Saunders (Distributional List Birds of Montana, p. 141), locating them in banks along streams, railroads, and highways. I have observed them digging burrows in banks of clay, of sand, and of gravel.

In this locality the nests are situated in the banks from one to fifty feet above the streams or roads; the burrows generally extend upward at a slight angle a distance of ten to twenty-four inches, ending in a shallow depression where a nest of dry grass and rootlets is constructed.

In the vicinity of Fortine I have been able to determine the stage of nesting, at some time during the season, shown by thirty-four nests of the Rough-winged Swallow. As no definite nesting records for this species in Montana have been published, I give below the range of dates, for different stages of nesting, which these records show. Nest under construction:

May 8, 1931, to June 15, 1929. Eggs (seven nests): June 14, 1928, to July 6, 1923. Young in nest: June 8, 1921, to July 9, 1928. Nine other nests, young left the nest by: July 22, 1931, to July 29, 1930.—WINTON WEYDEMEYER, *Fortine, Montana.*

The Starling as a Mimic.—Dr. Charles W. Townsend ('The Auk,' Vol. XLI, 1924, pp. 541–552) says (p. 544), "I am inclined to think that individual Starlings vary greatly in their powers of mimicry." My experience accords with his surmise, indeed it does more: it affords a superlative instance of its truth.

After February 15, 1915, when I first observed the Starling in Lexington, Mass., the bird became progressively commoner in the town until, say in 1925, it was abundantly represented there. During the nine years following its first appearance, I was in the field a good deal, meeting the bird daily in the latter part of the period, and in all this time I heard a Starling utter the note of *only one other bird.* This was the whistle of the Cowbird—the upward-sweeping whistle followed by two short notes on a lower pitch—which may be suggested by the syllables, *whee, too-too.* This note I heard in several of the years, perhaps half a dozen times in all. I was aware that the Starling whistled and sang like a Wood Pewee, a Bluebird or what not; I was on the watch for instances of mimicry; and, guarding against error, I never assumed, as we used to do in the old days, that the song of the Bluebird meant that the Bluebird was here; that the whistle of the Wood Pewee was as good as the bird in the hand. In spite of the evidence in the literature, piling up as the years went by, that the bird was a mimic, the Starling was no mimic, except of the Cowbird, to me.

Then, in Cohasset, Mass., late in December, 1924, from a group of Starlings which had been "clatt'rin' in tall trees" came, one right after another, the song of the Phoebe, the whistle and the scatter call of the Bobwhite, the *wee-chew, wee-chew* of the Flicker, the song, nearly perfect, of the Meadowlark, the sharp call-note and some Vireo-like phrases of the Purple Finch, the Wood Pewee's peaceful whistle, the rolling *too-wheedle* of the Blue Jay, the two-note whistle of the Chickadee, a note unmistakably that of the Goldfinch, and the Red-winged Blackbird's cluck and the gurgling part of its song. In ten minutes, thirteen notes of ten different birds, given by a flock of Starlings—perhaps by one Starling; an accumulation of audible evidence to convince the stubbornest juror.

Some of these notes no Starling could have heard for weeks, or months—and no more could we—yet the power to reproduce them was there. It seems almost incontrovertible not to "suppose the self-same Power" that enabled us to recognize these notes, made it possible for the Starling to call them up out of the past.—WINSOR M. TYLER, *112 Pinckney St., Boston, Mass.*

The Names of Two Genera of Timaline Birds.—Oberholser (Smiths. Misc. Coll. Quarterly Issue, vol. 48, pt. 1, May 13, 1905, p. 65) proposed

Horizillas to replace *Malacopteron* Eyton, preoccupied, but Gistel (Isis von Tilesius, München, 1850, p. 95) had many years previously noticed that Eyton's name was preoccupied and proposed *Malacornis* to replace it, which must be used. Later Oberholser (Smiths. Misc. Coll., vol. 74, no. 2, Sept. 27, 1922, p. 1) has endeavored to show that the type of *Alcippe* Blyth (Journ. Asiat. Soc. Bengal, vol. 13, pt. 1, no. 145, May 1844, p. 384) is *Trichastoma affine* Blyth and therefore should replace *Horizillas* and renames *Alcippe* of authors, *Alcippornis*. He has overlooked the fact, however, that Blyth a few pages previously to his formal proposal of *Alcippe* (idem., p. 370) had used the name in conjunction with *Timalia poiocephala* Jerdon, which becomes the type by monotypy. Stuart Baker (Fauna Br. Ind. Birds, 2d ed., vol. 7, 1930, p. 50) has used *Ophrydornis* Büttikofer for *Malacopteron* Eyton, but this is inadmissible as Oberholser has shown when he proposed *Horizillas*. To summarize, the two genera will stand as follows:

1. *Malacornis* Gistel, 1850.

Type, *Malacopteron magnum* Eyton.

Malacopteron, Eyton, 1839, not Serville, 1835.

Setaria Blyth, 1844, not Oken, 1815.

Horizillas Oberholser, 1905.

Alcippe Oberholser, 1922, not Blyth, 1844.

Ophrydornis Stuart Baker, 1930, not Büttikofer, 1895.

2. *Alcippe*, Blyth, 1844.

Type by monotypy, *Timalia poiocephala* Jerdon, of which *Alcippornis* Oberholser (Type, *Alcippe cinerea* Blyth, not Eyton) is a synonym.—J. H. Riley, *U. S. National Museum, Washington, D. C.*

The Loggerhead Shrike, an Addition to the Virginia Avifauna.—To settle the sub-specific identity of the shrikes of southeastern Virginia, on March 30 and April 8, 1932, I collected a pair, the female of which contained a fully formed egg when shot.

They were later submitted to Dr. Harry C. Oberholser, who finds them to be the Loggerhead Shrike (*Lainus ludovicianus ludovicianus*). He also writes: "Since these, without doubt represent the breeding form of Amelia, it extends the range of this form up the coast to southeast Virginia, constituting apparently the first authentic record of this bird for the state."

Amelia is forty miles west by south from Richmond and fifty-five miles north of the North Carolina state line.

Dr. J. J. Murray of Lexington, Va., in his article in the April issue of 'The Auk' on "Additions to the Virginia Avifauna," predicted that the Loggerhead Shrike would yet be found in Virginia.—John B. Lewis, *Amelia Court House, Va.*

Western Palm Warbler in Massachusetts in Spring.—Apparently no specimens of *Dendroica palmarum palmarum* have been collected in New England in the spring. Last May 3 I had an excellent observation of an

unusually distinctive individual. It perched, facing me, a few inches above the ground, every so often opening its bill and uttering a run of five or six faint notes. The first thing noticed was that the yellow throat was completely and definitely surrounded by soiled whitish. Next, the pileum was not chestnut but like the gray, streaky back—possibly a shade darker. The superciliary line was yellowish at front but white and wider toward the rear. Breast and belly were soiled whitish, evenly and faintly streaked. Then the bird got down and moved about the ground with the characteristic tail-motion, showing abruptly greenish-yellow upper tail-coverts and clear yellow under tail-coverts. It was thus much more unlike the Yellow Palm than most Western Palms are, especially in spring; but I found on page 85 of volume I of the 'Bulletin of the Nuttall Ornithological Club' (where Ridgway first divided the species) descriptions of a male from Waukegan and a female from Calumet that corresponded to the bird I saw. The *sotto voce* song perhaps indicates a male—probably a *young* male—but the absence of any chestnut cap seems likelier to mark a female.—S. A. Eliot, Jr., *Smith College, Northampton, Mass.*

The Hoary Redpoll in Montana.—For several days during February and March of 1933, a small flock of Common Redpolls (*Acanthis linaria linaria*) frequented the yards of my home near Fortine, Montana, feeding on weed seeds of various kinds. On February 27, and again on March 1, a Hoary Redpoll (*Acanthis hornemanni exilipes*) occurred with the darker birds. Several times I was able to watch it from a distance of less than ten feet, and to compare its size, color and markings with those of the nearby Common Redpolls.

Previous records of the occurrence of the Hoary Redpoll in Montana seem to be limited to these: two specimens were taken at Miles City in 1900 by C. F. Hedges (Auk, XVIII, p. 195) and one was observed in Dawson County in 1905 (Auk, XXII, p. 313).—Winton Weydemeyer, *Fortine, Montana.*

Bachman's Sparrow in the Virginia Blue Ridge.—On April 14, 1933, while on a four-day walking trip through the mountains, I was surprised to find a singing male Bachman's Sparrow (*Aimophila aestivalis bachmani*) in a pasture field at an elevation of about 2500 feet. The locality was the base of "The Rocks" on Humpback Mt. in Augusta County. Three of us watched the bird for several minutes through 8-power binoculars at a distance of about 35 feet. This species is of infrequent occurrence in Virginia and there seems to be only one other record from the mountains, according to the recent paper, "Additions to the Virginia Avifauna" by Dr. J. J. Murray ('The Auk' L, 2, 198).—Ruskin S. Freer, *Lynchburg, Va.*

A Late Migration of Fox Sparrows.—We have had an unusual visitation of Fox Sparrows (*Passerella i. iliaca*) in our New York district this spring. Last year in Central Park we observed only a few individuals; this year the first one was observed on February 26, 1933; they straggled in

every few days thereafter, but on March 31, 1933 we had a "wave," more than one hundred of them feeding on two small lawns. They gradually disappeared, but on April 25, 1933 (an exceedingly late date for this vicinity) we had another small visitation in Central Park. At Battery Park, a small area, at the southern end of Manhattan, six of these sparrows also arrived on the 25th. At this writing (April 28) there are still a few left in our area—an exceptionally late date.—MARC C. RICH, *120 Broadway, New York City.*

The Lark Sparrow in Virginia.—About four miles from University, Va., on June 15, 1925, two Lark Sparrows (*Chondestes g. grammacus*) were seen, one of which was singing and chasing the other.

At the same place on July 9 one was seen and on July 23 five were found there, four of which were young which were being fed by the single adult.

These observations were made by a capable observer.

In May 1927, I myself saw two Lark Sparrows at the same spot, one of which was singing. I am quite familair with the species in the West.—MARTIN CURTLER, *University, Va.*

European Goldfinch in Western Massachusetts.—The curious oversight by which *Carduelis carduelis* was omitted from E. H. Forbush's monumental 'Birds of Massachusetts and Other New England States' may have been due in part to the entire absence of recent records from anywhere in that region. Since its publication three or four individuals have been noted, as follows:

January 29, 1930, a strange bird appeared at the banding-station of Mrs. E. H. Wilder, 5 Shepard St., Westfield, Mass. Trapped, it was taken to Thornton W. Burgess in Springfield and identified by him as a European Goldfinch. It was then carried back, banded C25713, and released. It remained about the station until March 11.

February 23, 1930, another was brought dead to Mr. Burgess, which had been mauled by some animal; its tail was gone and its wings damaged.

January 6, 1931, Mrs. Wilder's banded bird re-appeared at her station and stayed until January 22. After a three weeks' absence, it came back on February 13, and remained until March 12. There is something suggestive about its departure on March 11 one year and March 12 the next.

In the mild winter of 1932 the bird did not show up at Westfield. At Northampton, however, on April 26, it—or at least a European Goldfinch wearing a band—turned up with a companion. Whether they were male and female could not be ascertained, but until May 4 they stayed in the same riverside tract, and were visited by bird-lovers from all around.

On June 8, 1932, a lady in Amherst who had seen the bird identified one (perhaps the same individual) among a flock of American Goldfinches in her back yard.—S. A. ELIOT, JR., *Smith College, Northampton, Mass.*

Notes on the Birds of Berkshire County, Massachusetts.—On April 4 I observed a pair of Migrant Shrikes (*Lanius ludovicianus migrans*)

in the eastern part of Pittsfield. The underparts were absolutely without barring.

Miss Margaret Hightower, of the Pittsfield Museum staff, and I saw a Red-headed Woodpecker (*Melanerpes erythrocephalus*) on May 17 in Pittsfield. This species has been known to breed here but it is usually merely a casual visitor.

S. Morris Pell, Warden of the Pleasant Valley Sanctuary in Lenox, located a Dowitcher (*Limnodromus griseus griseus*) a new record for the county, on August 19. It was seen again at the Pittsfield Sewer Beds on the 23rd by Miss Hightower, Miss Frances Palmer, and G. B. Hendricks.

Faxon and Hoffman, in 'The Birds of Berkshire County,' (1900) speak of the Herring Gull as "extremely rare." On September 28, I identified one at Onota Lake, Pittsfield, and several fishermen told me that they had seen gulls during the year.

On October 2, while at the Sewer Beds, I observed a Ruddy Turnstone (*Arenaria interpres morinella*), a bird which had not previously been reported in the county. I studied it for an hour at a distance varying from ten to fifteen yards. It had almost fully acquired its winter plumage.

Red-legged Black Ducks (*Anas rubripes rubripes*) are probably rather common in the Berkshires but they have not been reported until this year. On December 1 I saw a flock of seven or eight Black Ducks at unusually close range and noticed that one of the birds had bright coral-red legs.

Game Warden Ziegler found a female Lesser Scaup Duck (*Nyroca affinis*) on the ice at Onota Lake on December 17. He presented it to the Sanctuary in Lenox where it was identified by Mr. Pell. It was seen later by S. Waldo Bailey and G. B. Hendricks. This is a new record for the county.

On November 3, a dead male Scarlet Tanager (*Piranga erythromelas*) which had only about half acquired its winter plumage, was brought to the Museum. It had been found in Windsor and was seen alive for about ten days before it died. The bird had lost most of its tail and probably was unable to fly any great distance.—G. B. Hendricks, *Pittsfield, Mass.*

Notes from Dorchester Co., Maryland.—Upon a trip to the town of Fishing Creek in Dorchester County, Maryland, on January 26, 1932, I was shown a collection of about one hundred mounted birds which had been taken nearby by Elmer Hall, among which were several unusual specimens for the locality. On December 11 and 12, 1930, at Cambridge, Maryland, with Robert P. Allen of New York City, I catalogued another collection of birds mounted by Elmer Hall and by him presented to the Cambridge High School. This collection was also of birds taken near Fishing Creek and contained rare species for the lower Eastern Shore of the state. I list them herewith:—

Moris bassana. Gannet.—A mature specimen is in the High School collection above referred to. Mr. Hall reports that it was found dead in the meshes of a pound net set for fish near Fishing Creek. He does not remember the year it was taken but knows that it was in the Spring seven or eight years ago.

Somateria spectabilis. KING EIDER.—A female was collected by Elmer Hall near Fishing Creek in November, 1926, and is among the birds that were in the show window of his store at the time I was there.

Larus marinus. GREAT BLACK-BACKED GULL.—The specimen which I saw in the collection in the store of Mr. Hall was an immature bird 29 inches long and reported by Mr. Hall to have been found dead along with Herring Gulls at the edge of a small island in Chesapeake Bay, out a few miles from Fishing Creek, in November, 1926. He said this and the other gulls found at that time were all oil soaked and this specimen still showed oil marks on the breast when I parted the feathers.

Cryptoglaux acadica acadica. SAW-WHET OWL.—Mr. Hall, advises me that he found this bird, now in the High School collection, caught in a muskrat trap set on a pole in his marsh near Fishing Creek. It was the only one of the kind he had seen for a number of years.

Antrostomus carolinensis. CHUCK-WILL'S-WIDOW.—A mounted specimen of this species is in the Cambridge High School collection. Mr. Hall states: "This bird was killed in the woods back of the Catholic Church at Fishing Creek. . . . I have heard quite a number of these birds since but this is the first one I have seen dead."—S. E. PERKINS, III, *Indianapolis, Ind.*

Winter Notes from Back Bay, Virginia and North Carolina.—The following notes were made during field trips in the Back Bay region in Virginia and North Carolina on January 19 and 21, 1933:

Pisobia minutilla. LEAST SANDPIPER.—A flock of about twenty was seen by a group of members of the Virginia Society of Ornithology, including the writer, at the Corey Club at the south end of Back Bay, just over the state line on the North Carolina side, on January 21. We studied them with glasses at fifteen yards range and could easily detect the yellowish-green color of the legs. There are but few winter records in North Carolina, none so far north as this.

Larus marinus. GREAT BLACK-BACKED GULL.—One in adult plumage was seen by Mr. A. O. English and the writer at close range in a flock of Herring Gulls flying along the beach near Sand Bridge, Virginia, about ten miles south of Virginia Beach, on January 19.

Sterna forsteri. FORSTER'S TERN. We saw a flock of ten close at hand over the surf near Sand Bridge, Virginia, on the same day. They were in adult winter plumage, the crown white, the black patches through the eyes large but not meeting on the occiput, which was much lighter. I know of no previous winter records for Virginia and of no recent winter records for North Carolina.—J. J. MURRAY, *Lexington, Virginia.*

Notes from Baldwin County, Alabama.—*Casmerodius albus egretta.* AMERICAN EGRET.—On December 3, 1932, two were noted by Duncan McIntosh of Fairhope, Ala., in the marshes at the head of Mobile Bay. McIntosh also saw one flying over the beach at Fairhope on December 24, 1932. This seems to be the first winter record for Alabama.

Florida caerulea caerulea. LITTLE BLUE HERON.—Two were seen, an adult and an immature in the white phase, at the head of Mobile Bay on December 3, 1932, by D. McIntosh. Also a first winter record.

Falco columbarius columbarius. EASTERN PIGEON HAWK.—A bird was noted at Fairhope on October 8, 1932, and identification confirmed by Mr. Francis M. Weston of Pensacola, Florida, who was present at the time. This is the second record for Baldwin County.

Rallus limicola limicola. VIRGINIA RAIL.—On December 3, 1932, Lieut. J. G. Dreyspring, U. S. M. C., took a Virginia Rail a few miles northeast of Loxley, Baldwin County. The specimen was identified by Mr. Francis M. Weston. This is believed to be the only winter record of this species in Alabama.

Fulica americana americana. AMERICAN COOT.—One was seen at Gulf Shores on October 8, 1932. A very early autumn record.

Actitis macularia. SPOTTED SANDPIPER.—On December 30, 1932, and again on January 17, 1933, a Spotted Sandpiper was observed on the beach at Fairhope by H. Flagg. This is believed to be the only winter record for the state.

Pisobia melanotos. PECTORAL SANDPIPER.—Record of October 8, 1932, at Gulf Shores, by far the latest known for the state.

Larus delawarensis. RING-BILLED GULL.—One was observed at Gulf Shores on October 8, 1932, and confirmed by Mr. Weston who was present. A very early fall record.

Columbigallina passerina passerina. GROUND DOVE.—Three Ground Doves were noted by Homer Flagg and Kenneth Edwards at Gasque, in Baldwin County, on February 2, 1933, constituting the first definite record for the coastal region.

Chaetura pelagica. CHIMNEY SWIFT.—Two Chimney Swifts were seen at Fairhope by D. McIntosh on November 4, 1932. The latest fall record for the state.

Archilochus colubris. RUBY-THROATED HUMMINGBIRD.—An immature bird of this species was noted at Fairhope on January 1, 1933, by Miss Anna Braun and Mrs. Braun, apparently the first winter record for Alabama.

Polioptila caerulea caerulea. BLUE-GRAY GNATCATCHER.—Homer Flagg observed one at Fairhope on December 7, 14 and 16, 1932, apparently a first winter record.

Sturnus vulgaris vulgaris. EUROPEAN STARLING.—One was shot from a flock of about 20 on December 22, 1932, near Fairhope, Ala., by Paul Titus, the first record for the coast counties.

Dendroica virens virens. BLACK-THROATED GREEN WARBLER.—Six were noted on October 6, and six on October 7, 1932, by H. Flagg at Fairhope. Three were seen by me on October 17 and 18, 1932, and three again on November 9, 1932, by H. Flagg. Howell does not mention finding this bird in the maritime counties.

Dendroica dominica dominica. YELLOW-THROATED WARBLER.—One was noted at Fairhope by H. Flagg, on September 18, 1932, apparently the first fall record for the state.

Hedymeles ludoviciana. ROSE-BREASTED GROSBEAK.—An immature male was found dead by Kenneth Edwards at Fairhope on October 9, 1932. It is an uncommon migrant in Alabama.

Passerina cyanea. INDIGO BUNTING.—An immature male was picked up dead by S. W. Alexander at Fairhope on October 6, 1932, the first autumn record for the southern counties. I personally have noted it as fairly common in the spring.

Carpodacus purpureus purpureus. EASTERN PURPLE FINCH.—One of this species was seen at Fairhope on January 18, 1933, by D. McIntosh, apparently the first record for the coastal counties.

Junco hyemalis hyemalis. SLATE-COLORED JUNCO.—One was noted at Fairhope on November 13, 1932, by D. McIntosh. H. Flagg reports ten seen on January 3, 1933, fifteen on January 8, and again fifty on February 4, 1933. These are the first records for the coast region.—HELEN M. EDWARDS, *School of Organic Education, Fairhope, Alabama.*

Notes from Mountain Lake, Florida.—The following notes have been made on my winter sojourns at Mountain Lake, Fla., about thirty miles east of Lake Kissimmee.

Ardea wurdemanni. WÜRDEMANN'S HERON.—On March 14, 1931, while motoring from Lake Wales to Lake Kissimmee, in the ditch along the roadside about five miles from Lake Kissimmee, I was fortunate enough to see one of these herons. It allowed me to approach so close that there was no question of its identity.

Aramus pictus pictus. LIMPKIN.—There are still many Limpkins in the Kissimmee district and a particularly large colony on the stream between Lake Rosalie and Tiger Lake which is heavily wooded and very wild.

Xanthocephalus xanthocephalus. YELLOW-HEADED BLACKBIRD. On March 5, 1932, I secured, near the public playground, near Lake Wales, Fla., a Yellow-headed Blackbird which I believe is the fifth record of the species for the state.—HENRY O. HAVEMEYER, *25 Broadway, New York.*

Notes from Tippecanoe Co., Indiana.—The following notes have been made during the past year by the writers, in Tippecanoe County, Indiana, which is located on the Wabash River in the west-central part of the state.

Casmerodius albus egretta. AMERICAN EGRET.—On the unusually late date of October 12, 1932, one bird, apparently normal, was seen at Headley's Lake, at which one or more birds had been frequently noted since late July. Usually all the Egrets have left Indiana by the middle of September.

Querquedula discors. BLUE-WINGED TEAL.—On July 8, 1932, a single individual was seen on Headley's Lake, and a trip there on July 18 dis-

closed a pair of adults with a brood of eighteen young, about three-fourths grown, swimming about. The young sought shelter in the high grass and weeds, and although a careful search was made only two were found. One was accidentally stepped on by a member of the party as it crouched in the grass, and its skin is now in our collection; the other was banded and released. This family group remained on the lake until early October. Nearly all nesting records in Indiana for the Blue-winged Teal have been confined to the northern tier of counties, the above being the first for Tippecanoe County in forty years of observations. Headley's Lake is nothing more than four, more or less connected, muddy ponds with areas of swamp grass and weeds between and about them and surrounded by cornfields.

Squatarola squatarola. Black-bellied Plover.—A. W. Butler in his 'Birds of Indiana,' 1897, speaks of the Black-bellied Plover as a "rare migrant" in the state, most of his records being confined to the Lake Michigan area. F. C. Dobelbower, informs us that he saw large flocks in Tippecanoe County thirty years ago but that the species is not common now. The writers had never seen the bird here until September 12, 1932, when a single adult male was collected at Headley's Lake. The skin is in our collection. The bird was in breeding plumage and was blind in the right eye, due evidently to a bacterial or fungous growth. It was bathing in shallow water by jumping nearly a foot into the air and fluttering its wings as it came down, at the same time uttering several short, low notes.

Micropalama himantopus. Stilt Sandpiper.—Up to July 30, 1932, the only authentic record of the Stilt Sandpiper for Indiana was a specimen taken October 10, 1892, by L. A. and C. D. Test from the bag of a neighbor who had been hunting at Headley's Lake. On July 30, 1932, one was seen at the same place and on August 8 two were collected from a flock of eight that was feeding with Yellow-legs and Solitary Sandpipers. A single individual was seen August 25.

Vireo philadelphicus. Philadelphia Vireo.—The first record of this bird for Tippecanoe County is of one taken by us September 9, 1932. It was an adult male, and the skin is now in our collection.

Calcarius pictus. Smith's Longspur.—Records of Smith's Longspur are quite scarce in Indiana and the following is the first for Tippecanoe County. An adult female was collected (skin in our collection) from a flock of six in a stubble field on the Wea Plains, April 16, 1932.—Louis A. Test and Frederick H. Test, *Purdue Univ., Lafayette, Ind.*

Bird Notes from the Chicago Area.—The following notes are selected from observations made by the writers in the Chicago area between 1923 and 1930. They consist of records of locally rare species and of unusual migration dates and breeding records. Most of the observations were made in Lake and Cook Counties, Illinois.

Cygnus columbianus. Whistling Swan.—A swan was seen at Beach, Lake County, on April 14, 1928.

Chen caerulescens. BLUE GOOSE.—Three were observed on the ice of the Indiana side of Wolf Lake, March 31, 1928.

Erismatura jamaicensis rubida. RUDDY DUCK.—A female with six small young was found July 23, 1927, at Lake Calumet, Chicago. They lost themselves in the rushes before any could be secured.

Falco peregrinus anatum. DUCK HAWK.—Regular in Cook and Lake Counties during the late summer and fall of 1927 and 1928. One was seen feeding on a tern (*Sterna forsteri ?*) October 4, 1927, at Evanston.

Phaeopus hudsonicus. HUDSONIAN CURLEW.—Two were seen off Evanston on October 13, 1923.

Micropalama himantopus. STILT SANDPIPER.—One was captured alive in Lincoln Park, Chicago, August 31, 1925.

Pisobia bairdii. BAIRD'S SANDPIPER.—Apparently a regular migrant along the lake at Beach and Waukegan. We secured the following specimens: male, August 14, 1927; female, August 28, 1927; male, September 17, 1927; female, September 24, 1927; female, August 8, 1928; female, September 14, 1930. We also have several sight records.

Lobipes lobatus. NORTHERN PHALAROPE.—An immature female was secured at Waukegan on September 14, 1930. There are few Illinois records of this species.

Bubo virginianus virginianus. GREAT HORNED OWL.—A nest with two eggs was found at Pistakee Bay, Lake County, February 25, 1928.

Sphyrapicus varius varius. YELLOW-BELLIED SAPSUCKER.—An immature male was collected at Beach on December 19, 1925, and one was seen December 26, 1927, at Waukegan.

Picoides arcticus. ARCTIC THREE-TOED WOODPECKER.—A male was seen at Marengo, McHenry County, Illinois, November 15, 1924, and a female at Evanston, Cook County, January 7, 1927.

Cistothorus stellaris. SHORT-BILLED MARSH WREN.—We found breeding colonies and collected specimens from the following northeastern Illinois localities: Hyde Lake, Lake Calumet, Winnetka, Arlington Heights, Beach, and Marengo.

Hylocichla ustulata swainsoni. OLIVE-BACKED THRUSH.—Two early fall migrants were obtained in 1927: an adult female at Waukegan, July 31; and an adult male at Beach, August 8.

Dendroica pinus pinus. PINE WARBLER.—Five specimens of this locally rare bird were secured at Beach in 1927: September 17, an immature male; October 12, one adult male, one adult female, and two immature females.

Agelaius phoeniceus phoeniceus. RED-WINGED BLACKBIRD.—An immature male shot from a flock of *A. p. arctolegus* at Waukegan on February 6, 1927, was identified by Dr. Harry C. Oberholser. All other winter redwings taken by us have been the northern race.

Sturnus vulgaris vulgaris. STARLING.—An adult male and an immature

male taken at Beach on October 22 and 29, 1927, respectively, are doubtless among the first of this now common bird to be collected in Illinois.

Hedymeles ludovicianus. ROSE-BREASTED GROSBEAK.—A late female was captured alive at Beach on November 12, 1927.

Passerculus sandwichensis savanna. SAVANNAH SPARROW.—A very late male was shot at Beach on December 21, 1927.

Ammodramus savannarum australis. GRASSHOPPER SPARROW.—A late fall record consists of an immature female secured at Beach on November 12, 1927.

Passerherbulus henslowii henslowii. HENSLOW'S SPARROW.—On the above occasion an immature male of this species was obtained from a group of three.

Melospiza lincolnii lincolnii.[1] LINCOLN'S SPARROW.—An early fall migrant was seen at Beach on August 1, 1928.

Melospiza georgiana. SWAMP SPARROW.—A wintering female was taken at Beach on January 15, 1927, with the temperature 13 degrees below zero.—JAMES STEVENSON, *Los Angeles, Calif.*, and PIERCE BRODKORB, *Evanston, Illinois.*

Recent Records for Oklahoma and Texas.—The following observations were made in the fall of 1932 while crossing through this area by automobile.

Pandion haliaëtus carolinensis (Gmelin). OSPREY.—Near Yukon, Oklahoma on October 13, one was seen carrying a large fish over a reservoir.

Muscivora forficata (Gmelin). SCISSOR-TAILED FLYCATCHER.—Three were seen and one was taken beyond the western limits of Sayre, Oklahoma on October 14. The late date of occurrence is interesting. Mrs. Nice (Birds of Oklahoma, Univ. Okla. Bull. n. s. no. 20, 1924, p. 56) records the latest in Cleveland County, Oklahoma as October 5 to 21.

Sturnus vulgaris vylgaris Linnaeus. STARLING.—On October 14 seven were seen flying south near Bridgeport, Oklahoma. Others were observed November 13, near Strawn, Texas. These represent the most western points at which this species was recorded.—ALEXANDER WETMORE, *U. S. National Museum, Washington, D. C.*

The Importance of Stoneflies in the Winter Food of Certain Passerine Birds.—The classic studies of Beal on the food of birds are known to all economic ornithologists. In 1898 (Farmers' Bull. 54, U. S. Dept. Agr.) he pointed out that the Tree Sparrow, in winter, fed entirely on weed seeds. What little has been published on the winter food of fringillids since that time appears to be in accordance with the observations of Beal. The writer wishes to record certain qualifying observations where these birds, together with other species, were found to feed on insects during the winter months.

[1] The authors have specially requested the retention of the double "i" in this and the preceding names although not in accord with the A. O. U. Check List.

During the winter of 1932–33 five Tree Sparrows were collected. Two were taken on December 24, one on the following day, one on January 21 and the last on February 20. The visceral contents of all were noted. As was to be expected, weed seeds formed the prominent part of their fare, but insects were found in four. Chief among these were small stoneflies, *Allocapnia recta*, which were determined by their describer, Dr. P. W. Claassen.

On January 21, 1933, two Chickadees and a pair of Golden-crowned Kinglets were shot. They had been observed several minutes before they were collected, and were busily feeding in the top of a willow, forty or fifty feet above a small stream. Their gizzards were all crammed with small stoneflies.

On March 27, 1933, I collected a Slate-colored Junco that had eaten, in addition to a number of weed seeds, several stoneflies. A Song Sparrow taken the same day had eaten a number of these primitive insects.

Briefly, wherever a small stream flows through brushy land, stoneflies are likely to be encountered. The nymphs live wholly submerged in the water, where they cling to the undersurfaces of stones. A warm day throughout the winter will bring thousands of transformed imagos to the vegetation surrounding the water. A count on February 20, 1933, when the temperature reached 55° F., revealed an average of 23 stoneflies to a square foot near dusk. These were observed on the siding of a house near a stream. Thus it can be seen that, potentially, they are a source of food of the first magnitude for birds that will eat them. As few birds would probably refuse them, this may account for the little resident flocks of sparrows, kinglets, etc., that customarily follow the small streams and their environs throughout the winter.

The reader must be reminded that the stoneflies mentioned are all of the small, soft-bodied species, seldom exceeding ten millimeters in length and rarely more than two in width. They are not to be confused with the large species, such as *Perla*.—W. J. Hamilton, Jr., *Cornell University, Ithaca, N. Y.*

Speed of Racing Pigeons.—In view of the interest in the speed of flying birds the following data secured from a friend who breeds racing pigeons may be worth publishing although I am aware that there is a mass of similar data in the records of various Racing Pigeon Associations.

Attalla, Ala., to Washington, D. C., 650 miles by air, 17.1 hours; average speed, 38 miles per hour.

Chicago, Ill., to Beltsville, Md., 580 miles by air, 15.66 hours; average speed, 37 miles per hour.

Morristown, Tenn. to Washington, D. C., 400 miles, 7.16 miles; average speed 56 miles per hour.

Bristol, Tenn. to Washington, D. C., 325 miles, 6.25 hours, average speed, 52 miles per hour.

Pulaski, Va., to Washington, D. C., 250 miles, 4.30 hours; average speed, 56 miles per hour.

Cameron, W. Va. to Washington, D. C., 200 miles, 2.7 hours; average speed, 74.5 miles per hour (a world's record for the distance).

Charlottesville, Va. to Washington, D. C., 100 miles, 1.8 hours; average speed, 54.5 miles per hour.—ROBERT A. MULLEN, *Washington, D. C.*

RECENT LITERATURE.

Leopold's 'Game Management.'—In this volume[1] we have the most comprehensive summary of the problem of game conservation that has ever appeared. In his preface the author asks what is the good of man's power over nature if it is to be used solely for bread-and-butter ends? and adds "Are we too poor in purse or spirit to apply some of it to keep the land pleasant to see, and good to live in?"

"Game can be restored, he says, by the creative use of the same tools which have heretofore destroyed it—axe, plow, cow, fire, and gun; and control comes from the co-ordination of science and use."

Mr. Leopold's book is so full of detailed information on all sides of his subject that it is hopeless to attempt to review it adequately in the short space at our disposal, and we, therefore, select one of the eighteen chapters for comment—that which deals with "Predator Control." Our author very properly emphasizes the complexity of this question and the attitude of the average sportsman who plays a *leading part* in the drama although he usually "has neither seen nor read more than snatches of the *other parts.*" The biologist he says, takes a "long-time" viewpoint, fearing the degeneration of game stocks and the elimination of predators as an esthetically valuable part of the fauna and the possible dangerous reaction from too stringent control measures. The sportsman on the other hand takes a "short-time" viewpoint, fearing that decrease in game may result in the prohibition of hunting and he thinks to stay such action by the extermination of predators without any understanding of what biologists are talking about when they oppose his policies. Mr. Leopold thinks that an adjustment of these viewpoints is possible with a better understanding of the problem and he has undoubtedly presented all sides of this question, as well as other involved questions, if only sportsmen and those in charge of game legislation will *read* his volume.

The greatest hindrances to harmony of views and adequate action is, to our mind, (1) the political complection of many State Game Commissions and their control by the less competent sportsmens' organizations which exist, as we heard one representative express it "to shoot game rather than to preserve it," and (2) the political influences which can be brought to bear upon Congress and Federal Commissions by powerful agricultural and stock raising organizations.

The whole matter is one of education and whether the general public and their representatives can be educated before wild life in general is decimated is a question. Mr. Leopold's admirable work will furnish the data for such education but it is perhaps too much to expect the sportsmen to read it

[1] Game Management | By Aldo Leopold | Consulting Forester. | Drawings by | Allan Brooks | Charles Scribner's Sons, 597 Fifth Ave., New York. London 1933. Pp. i–xxi + 1–481. Price $5.00.

through and we trust that those can be found who will prepare terse articles based upon his book with easily grasped facts and arguments, and spread them in the sportsmen's journals and the daily press throughout the country.—W. S.

Jones on 'Insect Coloration and the Relative Acceptability of Insects to Birds.'—After Mr. W. L. McAtee's several able attacks on the theory of protective coloration, it is interesting to find something[1] on the other side of the question although the author accepts most of Mr. McAtee's conclusions and says: "Belief in the protective value of a character is not invalidated by evidence that it is occasionally disregarded by many enemies, or totally disregarded by a few, for it may still be one of the many factors in the equilibrium of survival." From this viewpoint he sees no irreconcilable conflict between the stomach examinations employed by Mr. McAtee and the experiments which he describes.

Mr. Jones' interesting experiments consisted in spreading various dead insects on bird feeding shelves, being careful to avoid any advantage in position, etc., and carefully recording the preferences displayed by the birds, eleven species of which fed there. The results of his experiments are given in detail and his conclusions are that insect acceptability to birds is relative and its causes complex; that coloration has material influence, and that in general brighter colored insects are the less acceptable; that there is a prevalence of so-called "warning coloration" among insects which feed on poisonous or acrid plants but that the relative unacceptability of many insects must depend upon other factors. Mr. Jones has also carried on interesting experiments on the acceptability of various dead insects to ants.—W. S.

Fauna of the National Parks.—This excellent publication[2] discusses the problems confronting the National Parks Service with regard to the conservation of the natural fauna and flora. The conditions at the time of settlement of the West and the changes already wrought by man before the parks were established are described as well as the efforts that have been made to re-establish the former conditions.

The point is emphasized that the arbitrary boundaries of the parks often exclude areas absolutely essential to the existence of their animal inhabitants, as for instance the lack of winter ranges for certain species which must as a result go outside the park at this season if they would survive. The problems of protecting the vegetation from the animals and the methods of control of the latter are discussed and there is an interesting

[1] Insect Coloration and the Relative Acceptability of Insects to Birds. By Frank Morton Jones, Sc.D. Trans. Ent. Soc. London, LXXX, pp. 345–386, pll. 18–28. Deecember 31, 1932.

[2] Fauna of the National Parks of the United States. A Preliminary Survey of Faunal Relations in National Parks. By George M. Wright, Joseph S. Dixon, Ben H. Thompson. Contribution of Wild Life Survey Fauna Series No. 1. May, 1932. Washington, 1933. Pp. 1–157, figs 1–56. Price 20 cents, U. S. Govt. Printing Office.

summary of some of the principal forms of terrestrial vertebrates characteristic of the several parks. The authors have prepared a valuable report and one that will be interesting and instructive to all who have at heart the welfare of our national parks. It is well illustrated with numerous half-tone cuts.—W. S.

Bond's 'My Bird Boarders.'—Mr. Frank Bond has for some years maintained a feeding shelf for birds in Cleveland Park, Washington, D. C. and in the present little booklet[1] he has presented the results of his observations upon the various species that have come to his "cafeteria." His accounts of his visitors not only form attractive reading but add to our knowledge of the behaviour of birds whose biographies we had thought were already completed. Forty-six species have come under Mr. Bond's observation at his feeding station and he has added to the interest of his accounts by presenting a number of original drawings.—W. S.

La Touche's 'Handbook of the Birds of Eastern China.'—Part IV of Vol. 2 of this important work[2] has just appeared covering the gulls and terns, plovers, jacanas, cranes, etc., and part of the sandpipers. It maintains the high standard set by the previous parts and the reviewer, having had occasion recently to make extensive use of Mr. La Touche's work, can testify from personal experience to its excellence. It is invaluable to anyone working on the Chinese avifauna.—W. S.

Swann and Wetmore on the Birds of Prey.—Part XI of this monograph[3] has appeared. It completes the genus *Aquila* and covers allied genera of eagles such as *Spizaetus*, *Circaetus* etc. The two plates by Grönvold depict *Hieraaetus pennatus* and *Lophotriorchis kienerii*.

This excellent work is being carried on by Dr. Alexander Wetmore from the manuscript left by the late H. Kirke Swann with the addition of some further data, but the general plan and arrangement of species is as Mr. Swann left them. We are glad to see that satisfactory progress is being made with its publication.—W. S.

Other Publications.

Bailey, A. M., Brower, C. D. and Bishop, Louis B.—Birds of the Region of Point Barrow, Alaska. (*Program of Activities*, Chicago Acad. Sciences, IV, No. 2, April, 1933, pp. 15–40, price 25 cts.)—A fully annotated list of some 125 species with several half-tone cuts from photographs.

Bailey, A. M. and Dickinson, F. R.—Camera Hunting in the Haunts of the Golden Eagle. (*Natural History*, May–June, 1933.)—Beautifully illustrated.

---

[1] My Bird Boarders. By Frank Bond. Foreword by Dr. Theodore S. Palmer. The Green Lamp League. International Building, Washington, D. C. Pp. 1–104.

[2] A Handbook of the Birds of Eastern China. By J. D. La Touche. Vol. II, Part 4. Pp. 289–400, pll. XX–XXII. April, 1933. Price 7s. 6d. net per part. Taylor and Francis, Red Lion Court, Fleet Street, London, E. C. 4.

[3] A Monograph of the Birds of Prey (Order Accipitres). By H. Kirke Swann. Edited by Alexander Wetmore. London. Wheldon & Wesley, Ltd., 2, 3 & 4 Arthur Street, New Oxford Street, W. C. 2. Part XI, May 1933. Pp. 65–160.

Bailey, A. M. and Niedrach, R. J.—The Avo-chic. (*Natural History*, March–April, 1933.)—An Avocet hatches a domestic chicken.

Bangs, Outram, and Loverage, Arthur.—Reports on the Scientific Results of an Expedition to the Southwestern Highlands of Tanganyika Territory, III, Birds. (*Bull. Mus. Comp. Zool.*, LXXV, No. 3, Feb. 1933, 143–221, pl. 1.)—An annotated list of 246 species or subspecies obtained by Mr. Loverage during the winter and spring of 1929–30. Six new forms were previously described. (Proc. N. E. Zool. Club, XII, pp. 93–96.)

Beatty, M. E., Presnall, C. C., and Harwell, C. A.—The Birds of Yosemite National Park. (*Yosemite Nature Notes*, XII, No. 5, May, 1933.)—A list of 183 species with indication of status and "where best seen," followed by a consideration of the permanent residents and the winter visitants with some account of each, and a table of arrival and departure dates of summer visitors. A most welcome publication to visitors to the park. Price 25 cts.

Brooks, Allan.—Notes on a Short Trip to Nova Scotia and New Brunswick. (*Canadian Field Naturalist*, April, 1933.)

Elliott, Paul R.—Temperature and Relative Humidity in Relation to the Ending of the Evening Song of Birds. (*Jour. Tenn. Acad. Sci.*, VII, No. 3, 1932, pp. 204–213.)

Biological Survey, U. S. Dept. Agriculture.—Bird Allies of the Farmer. (Excerpt from Hearing before a Committee of the House.)—A list of birds with insect food of each.

Dixon, Joseph S.—The Falcons of the Great Smokeys. (*American Forests*, June, 1933.)—An account of the eyrie of the only pair of Duck Hawks nesting in the southern United States.

East, Ben. The Homes of Birds. (*American Forests*, April, 1933.)—With many photographic illustrations.

Ganier, A. F.—A Distributional List of the Birds of Tennessee. (*Tennessee Avifauna*, No. 1, Jan. 1933. Pp. 1–64.)—An excellent list of 293 species and subspecies presenting in three parallel columns the character of occurrence and abundance in the eastern, middle and western sections of the state, with characteristic habitat and length in inches. There are supplementary notes on bird protection, etc.

Ganier, A. F.—Water Birds of Reelfoot Lake, Tennessee. (*Tennessee Avifauna* No. 2, Feb. 1933.)—A sketch of this curious lake with map and a detailed account of the water birds that have occurred there.

Graham, Ritson.—Changes in the Distribution of British Geese. (*Scottish Naturalist*, March–April, and May–June, 1933.)

Greenway, James C., Jr.—Birds from Northwest Yunnan. (*Bull. Mus. Comp. Zoöl.*, LXXIV, No. 5, Feb., 1933. Pp. 109–168.)—An annotated list of the birds obtained by Dr. Joseph F. Rock on his expeditions of 1931 and 1932, for the Museum of Comparative Zoölogy. The region covered extended from Tengueh north to Mt. Gomba-La and east to Likiang. Some 216 forms are listed three of which have been described as new in a previous paper.

Hicks, Lawrence E. and Chapman, Floyd B.—A Statistical Survey of Ohio Winter Bird Life. (*Ohio Jour. Sci.* XXXIII, No. 2, March, 1933. Pp. 135–150.)—Lists of winter birds from various sources are presented with tabulations of relative abundance according to number of individuals, number of times reported, etc., etc., together with considerations of per cent of error in observation and the various factors involved in accurate field work. An important statistical paper.

Illinois Audubon Bulletin, 1933.—Contains articles on birds of Minnesota, Michigan, California and Illinois. Also sketches of the habits of the Cedar Waxwing, Purple Martin and American Eider.

Jamieson, William.—The Birds of Kelvin. (*Glasgow Naturalist*, April, 1933.)

Jespersen, J.—Observations on the Oceanic Birds of the Pacific and Adjacent Waters. (Vidensk. Medd. fra naturh. Foren. Bd. 94.)—Birds observed on the Danish "Dana" Expedition around the world; published in English. An annotated list of some sixty species noted on the voyage from Shanghai to Australia and thence to Panama.

Kuhn, Otto.—Physiology of Feather Growth. (*Roux' Archiv für Entwicklungsmechanik*, Vol. 127, 1932, pp. 456–541.)—An important paper on the factors determining form, size, structure and pigmentation of the growing feather. Among the many points demonstrated are that artificial molt can be produced by various methods; the threshold of the acting stimulus is different for different parts of the body; the number of feather generations between molts can be increased by experiment; the structure of these feathers can be changed by hunger and other stimuli; castrated drakes retain the ability to molt into an eclipse plumage which fact connects with other observations indicating that the male plumage is largely independent of the influence of the sex hormone. [In German: abstract furnished by Dr. Ernst Mayr.]

Lönnberg, Einar.—Linnaeus's Notes on Olof Rudbeck the younger's Lectures on Swedish birds. (*Svenska Linné-Sällskapets Arsskrift*, Argang XV, 1932, pp. 41–75.) [In Swedish.]

Mayr, Ernst.—Birds Collected During the Whitney South Sea Expedition, XII. (*American Museum Novitates*, No. 590, January 17, 1933.)—Three New Genera from Polynesia and Melanesia—*Edithornis silvestris* (gen. and sp., nov. p. 1); *Cichlornis whitneyi* (p. 2 and 4 gen. and sp. nov.); *Malacolestes* (p. 5, for *Rectes tenebrosus*).

Mayr, Ernst.—Two New Birds from Micronesia (*ibid.* No. 609, April 24, 1933.)—*Asio flammeus ponapensis* (p. 1) Carolina Isla.; *Hypotaenidia philippensis pelewanensis* (p. 3) Palau Isla.

Mayr, Ernst.—Notes on Polynesian Flycatchers and a Revision of the Genus *Clytorhynchus* six new subspecies are described and the removal of *Pinarolestes* (=*Clytorhynchus*) and "*Lalage*" *banksiana* to the Muscicapidae is found necessary.

Miller Loye.—A Pleistocene Record of the Flammeolated Screech Owl. (*Trans. San Diego Soc. N. H.*, VII, No. 19, March 31, 1933, pp. 209–210.)

Monk, Harry C.—The Water Birds of Radnor Lake [Tenn.] (*Jour. Tenn. Acad. Sci.*, VII, No. 4, October, 1932.)—An annotated list of 56 species with tables showing the daily fluctuation of numbers during each month in 1930. It is interesting to find the Bald Eagle and Osprey included in the "water birds" and why not? Our present classification makes it impossible to use the term in a technical systematic sense. These birds were always as much water birds as the Killdeer or Upland Plover and in the same way while our owls are still "birds of prey" they are no longer "Raptores."

More Game Birds by Controlling their Natural Enemies.—An excellent illustrated manual of the enemies of game but considering the wide spread prejudice against *all* hawks more emphasis might have been placed on the value of certain species and the line between good and bad hawks and owls more definitely derawn.

Riley, J. H.—Notes on Niltava smithi. (*Proc. Biol. Soc. Washington*, Vol. 46, pp. 65–66, March 24, 1933.)—Finds it close to *N. davidi lychnis* so far as males are concerned but the females are quite distinct. *N. williamina* he regards as probably identical with *smithi*.

Riley, J. H.—A new Swift of the Genus *Reinarda* from Venezuela. (*Proc. Biol. Soc. Washington*, Vol. 46, pp. 39–40, February 20, 1933.)—*R. squamata semota* (p. 39).

Schaanning, H. Tho. L.—A Contribution to the Bird Fauna of East Greenland and A Contribution to the Bird Fauna of Jan Mayen. (*Skrifter om Svalbanard og Ishavet*, No. 49, 1933.)—Annotated lists in English of birds obtained on the Norwegian Scientific expeditions to East Greenland.

Tavernar, P. A.—A Study of Kumlien's Gull. (*Canadian Field Naturalist*, May, 1933.)—Suggests the possibility of its validity as a species.

Van Rossem, A. J.—A Northern Race of Melzone rubricatum. (*Trans. San Diego Soc. Nat. Hist.* VII, No. 23, March 31, 1933. Pp. 283–284.)—*M. r. grisior* (p. 283) Hacienda San Rafael, Sonora.

van Someren, Vernon D.—Observations on the Nesting of the Blackbird. (*Scottish Naturalist*, May–June, 1933.)

Wetmore, Alexander.—Biographical Memoir of Robert Ridgway. (*Nat. Acad. Sci. Biographical Memoirs*, Vol. XV, 1932.)

The Ornithological Journals.

Bird-Lore. XXXV, No. 2. March–April, 1933.

The Long-Ears of the Cedar Groves. By Laidlaw Williams.—Long-eared Owls at Princeton, N. J.

Some Birds' Bathing Ways. By Joseph C. Fields.

Taming the Blue-Gray Gnatcatchers. By Maurice Brooks.—Excellent photographs of birds and nest.

The Bank Swallow's Story. By A. A. Allen.

Bird-Lore. XXXV, No. 3. May–June, 1933.

The Lark Bunting. By Roy M. Langdon.—With excellent photographs of the bird in Colorado.

Flight Maneuvers of the Raven. By W. W. Rubey.—In Wyoming.

When Brewster's Warbler Breeds. By William A. Paff.

The Condor. XXXV, No. 2. March–April, 1933.

Terns as Destroyers of Birds' Eggs. By A. J. Van Rossem.

Winter Behaviour of Two Semi-Albino Western Robins. By John B. Price.

Relations between Man and Birds in California. By Tracy I. Storer.

A Year's Study of Hose Finch Weights. By J. L. Partin.

Alexander Wetmore describes a new fossil bird *Ortalis tantala* (p. 64) and Hildegarde Howard, another, *Strix brea* (p. 66).

The Condor. XXXV, No. 3. May–June, 1933.

An Experiment upon a Roosting Colony of Black-crowned Night Herons. By E. Lowell Sumner, Jr.—Driven from a roost where they had become a nuisance by alarm clocks fastened in the tree.

Geographical Distribution in Relation to the Number of Eggs. By Charles K. Averill.

Individuality and territoriality as Displayed in Winter by Three Passerine Species. By Grace Tompkins.—Golden-crowned and White-crowned Sparrows, and Spotted Towhee.

The Leconte Thrashers of the San Joaquin. By Joseph Grinnell.

Wetmore describes a new fossil bird *Geranoides jepseni* (p. 150, gen. and sp. nov.).

The Wilson Bulletin. XLV, No. 1. March, 1933.

The Meaning of Bird Control. By W. L. McAtee.

Robins and Raspberries. By Grant Henderson.

Ornithological Reminiscences of Mid-Victorian Washington. By Morris M. Green.

A Mensural Study of a Collection of *Grus canadensis* from Iowa and Nebraska. By Philip A. Du Mont.

Notes on the Birds Found at Lake Johnston and Lost Mountain Lake, Saskatchewan, During April and May, 1922. By the late C. G. Harold.

The Ibis. XXX, No. 2. April, 1933.

Taxonomic and Field Notes on some Birds of Northeastern Tanganyika Territory, Part IV. By W. L. Sclater and R. E. Moreau.

Johann Matthaeus Bechstein, the German Ornithologist (1757–1822). By Hugo Hildebrandt.—With portrait.

Some Notes on the Birds of North Bornu, Nigeria. By A. K. Gibbon.

A Contribution to the Ornithology of Chinese Turkestan. Part I. By F. Ludlow assisted by N. B. Kinnear.

A Report on the Birds collected by the Vernay Expedition to Tenasserim and Siam. Part I. By Willoughby P. Lowe.

Notes on the Birds of Bear Island [north of Norway]. By G. C. L. Bertram and David Lack.

The Birds of South-West Transbaikalia, Northern Mongolia, and Central Gobi. Part V. By E. V. Koslova.

The Differential Characters in the Tarso-metatarsi of Gallus and

Phasianus as they bear on the Problem of the Introduction of the Pheasant into Europe and the British Isles. By Percy R. Lowe.—Finds no evidence of the presence of the Pheasant in England in Roman times nor is there evidence of its being indigenous in Europe.

Bulletin of the British Ornithologists' Club. No. CCCLXVII. March 25, 1933.

Jack Vincent describes 23 new birds from Africa, mainly Portuguese East Africa.

Col. Meinertzhagen describes two races of *Ammomanes deserti* from the Sahara, and Gregory M. Mathews a new genus *Tethysia* for *Procellaria tethys*.

Bulletin of the British Ornithologists' Club. No. CCCLXVIII, May 5, 1933.

Jack Vincent describes his journeys in Portuguese East Africa and describes three additional birds; Dr. G. Carmichael Lowe confirms the validity of *Limnodromus griseus hendersoni* Rowan; Admiral Lynes has a new *Cisticola;* G. L. Bates two new forms from West Africa and J. Delacour one.

Fin Salomonsen describes *Neodrepanis hypoxantha* Madagascar; W. S. Stachanow, *Riparia rupestris centralasica* from Alashan; D. Bannerman, *Pogoniulus scolopaceus angolensis* from Angolo; G. M. Mathews, *Diomedella cauta peruvia* from the coast of Peru.

Claude H. B. Grant and C. W. Mackworth-Praed discuss the type localities of *Sula s. sula* and *Pelecanus onocrotalus* and the relationship of several herons, describing *Egretta garzetta assumptionis* as new.

British Birds. XXVI, Nos. 11 and 12, April and May, 1933.

Mainly devoted to bird-banding records. April contains also the 1932 report for Norfolk and May presents some notes on Coots by H. J. Burkill.

The Emu. XXXII, Part 4. April, 1933.

The Ground Parrot. By K. A. Hindwood.—Interesting account of this fast disappearing species.

Observations on the Nesting Habits of the Black-throated Grebe. By Edwin Ashby.

Some Birds of the Heath Country. By A. J. Elliott.—North of Sydney.

Many other articles on life history of Australian birds and numerous excellent photographic illustrations.

L'Oiseau. III, No. 2. 1933. [In French.]

Notes on the Birds of the Philippines. By Marquis Hachisuka.

The Birds of Kwangsi. By K. Y. Yen.

What is *Ramphastos osculans* Gould? By C. E. Hellmayr.

Ornithological Migration Stations of Holland and Scandinavia. By R. Reboussin.

A Contribution to a Study of the Birds of Oubangui-Chari [West Africa]. By L. Blancou.

Some Observations on the Birds of Corsica. By R. F. Meiklejohn.

Notes on Some Rare Hummingbirds. By J. Berlioz and G. Rousseau-Decelle.—*Oreotrochilus bolivianus, Metallura primolina* and *M. atrigularis.*

The Ornithological Station of Castle Fusano. By J. Blanchard.—Conducted by Prince Francesco Chigi for bird banding purposes, the birds being caught in nets.

Journal für Ornithologie. LXXXI, Heft 2. April, 1933. [In German.]

An Expedition of Discovery to the Dutch East Indies. By G. Stein.

A Contribution to the Breeding Habits of *Burhinus o. oedicnemus.* By Walter Banzhaf.

Anser brachyrhynchus in Iceland. By G. Timmermann.

Migration Routes in Egypt. By Geyr von Schweppenburg.

On the Life of the Peregrine. By Camill Gugg.—Illustrated by a series of the finest bird photographs that we have ever seen.

Retrograde Evolution in a Honey-eater's Tongue. By Hans Scharnke.

Ornithologische Monatsberichte. XLI, No. 2. March, 1933. [In German.]

Observations on the Breeding Habits of *Rhinopomastus cyanomelas.* By W. Hoesch.

Systematic Position and Biology of Promerops. By Finn Salomonsen.

Contribution to our Knowledge of the Avifauna of Portugal. By Otto Steinfatt.

Ardeola speciosa continentalis (p. 41) is described by Salomonsen, from Siam, and *Zosterops minor gregaria* (p. 53) by E. Mayr, from Sattelberg.

Ornithologische Monatsberichte. XLI, No. 3. May–June, 1933. [In German.]

On the Life History of *Halcyon chelicuti.* By W. Hoesch.

A Picture of "*Sassius simplex.*" By Moriz Sassi.

A Contribution to Hypnosis in Birds. By G. Warnke.

On the Appearance of Tongue-worms in Birds. By R. Heymons.

On the Juvenal Plumage of *Stercorarius parasiticus* and *S. longicaudus.* By. E. Schuz.

Four new birds are described by W. Meise from Kansu, forms of *Calandrella Carduelis, Phylloscopus* and *Rhopophilus.*

NOTES AND NEWS.

Owing to the fact that several hundred members of the A. O. U. have been unable to pay their 1933 dues, the Publication Committee found itself without funds for printing the July 'Auk'. In this emergency several members generously guaranteed the cost of a reduced number and three papers were paid for, while some reserve funds were made available by the Council.

These facts are presented in explanation of the delay in the appearance of this issue and of the omission of "Obituaries" and the curtailment of "Recent Literature" and "Notes and News."—*Editor.*

THE AUK

A Quarterly Journal of Ornithology

ORGAN OF THE AMERICAN ORNITHOLOGISTS' UNION

Edited by Dr. Witmer Stone

ACADEMY OF NATURAL SCIENCES, LOGAN SQUARE

PHILADELPHIA, PA.

To whom all articles and communications intended for publication and all books and publications for review should be sent.

Manuscripts for leading articles must await their turn for publication if others are already on file, but they must be in the editor's hands at least six weeks before the date of issue of the number for which they are intended, and manuscripts for 'General Notes,' 'Recent Literature,' etc., not later than the first of the month preceding the date of issue of the number in which it is desired they shall appear.

Twenty-five copies of leading articles are furnished to authors free of charge. Additional copies or reprints from 'General Notes,' 'Correspondence,' etc., must be ordered from the editor when the manuscript is submitted.

THE OFFICE OF PUBLICATION

8 WEST KING STREET, LANCASTER, PA.

Subscriptions may also be sent to W. L. McAtee, Business Manager, 200 Cedar St., Cherrydale, Va. Foreign Subscribers may secure 'The Auk' through H. F. and G. Witherby, 326 High Holborn, London, W. C.

Subscription, $4.00 a year. Single numbers, one dollar.

Free to Honorary Fellows, and to Fellows, Members, and Associates of the A. O. U., not in arrears for dues.

OFFICERS OF THE AMERICAN ORNITHOLOGISTS' UNION

President: JAMES H. FLEMING, 267 Rusholme Road, Toronto, Canada.

Vice Presidents: ARTHUR CLEVELAND BENT, Taunton, Mass., HERBERT FRIEDMANN, U. S. National Museum, Washington, D. C.

Secretary: T. S. PALMER, 1939 Biltmore St., Washington, D. C.

Treasurer: W. L. MCATEE, 200 Cedar St., Cherrydale, Va.

THE AMERICAN ORNITHOLOGISTS' UNION AT A GLANCE

ORGANIZED—in New York City, Sept. 26, 1883: Incorporated—in Washington, D. C., Nov. 15, 1888.

OBJECTS: "The advancement of its members in Ornithological Science; the publication of a journal of Ornithology and other works relating to that science; the acquisition of a library; and the care and collection of materials relating to the above objects, under the restrictions and regulations established in its By-Laws."

OFFICERS: President, two Vice-Presidents, Secretary, Treasurer, and 7 Councilors. Officers and ex-Presidents are ex-officio members of the Council.

MEMBERS: Associates (unlimited), Members (125), Corresponding Fellows (100), Honorary Fellows (25), Fellows (50), Retired Fellows, Patrons. (Total membership, 1960 in 1930.)

DUES: Annual—Associates $3, Members $4, Fellows $5.
Life-Associates $50, Life-Members $75, Life-Fellows $100; Patrons $1000.

INCOME: From annual dues, sale of publications, life memberships, and contributions.

MEETINGS: Annual—usually in November; sometimes in October.

PUBLICATIONS: 'The Auk,' a quarterly journal in 49 volumes, with 3 general indexes: 1876–1900, 1901–1910, 1911–1920. 'Check List of North American Birds': 1st ed., 1886; 2d ed., 1895; 3d ed., 1910; 4th ed., 1931. 'Code of Nomenclature,' 1886; Revised ed., 1908. (See Auk, '24, 142.)

BREWSTER MEDAL: The proceeds of a fund of $7250, established in 1919 by the friends of William Brewster, awarded biennially to the author of the most important work relating to the birds of the Western Hemisphere published during the preceding six years.

SUBSCRIPTION to 'The Auk,' $4.00 a year (free to members).

A. O. U. CHECK LIST, Fourth Ed., $4.00.

WHERE TO FIND FURTHER INFORMATION.

ADDRESSES OF OFFICERS AND MEMBERS—Annual list in April Auk.

THE AUK (LOCATION OF SETS)—Auk, '19, 634; '20, 348; '24, 207; '29, 584.

THE AUK IN PUBLIC LIBRARIES—Auk, '30, 609.

BIOGRAPHIES OF DECEASED MEMBERS—Auk, '30, lxvi.

BREWSTER MEDAL—Auk, '20, 29; '22, 86; '24, 125; '25, 484; '26, 69; '28, 71; '30, 219.

BY-LAWS: Auk, '27, xi.

DATES OF PUBLICATION OF THE AUK (1912–1930) follow the Index in each volume.

HISTORY OF THE UNION: Allen, J. A., 'A Seven Years' Retrospect,' 1891; 'The A. O. U.,' Bird-Lore, 1899, 143.

Palmer, T. S., 'The A. O. U.,' Am. Mus. Journal '18, 473; 'Looking Backward,' Auk, '24, 139.

MEETINGS: Auk, '24, 143; '30, back cover of October number.

MEMBERSHIP:—Auk, '24, 140; Fellows, '18, 110; Foreign Members, '18, 266; Members, '18, 384; Associates, '18, 513.

PERMANENT FUNDS: Auk, '20, 513.